VOL. XXIII NEW YORK—THURSDAY, SEPTEMBER 29, 1910—CHICAGO No. 13

THE AUTOMOBILE

Await Starting Gun

LARGEST AND MOST VARIED FIELD IN HISTORY OF ROAD RACING READY FOR THE WORD IN VANDERBILT CUP AND ITS SHORTER AUXILIARIES

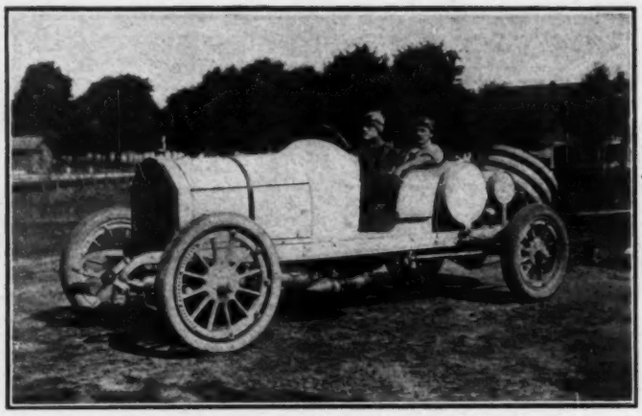
WITH an entry list never approached in point of size and variety, the Vanderbilt Cup race, the Wheatley Hills Sweepstakes and the Massapequa Sweepstakes closed Saturday night. At some stages of the running next Saturday over forty racing cars will be on the track at the same time.

CUP CONTESTANT PRACTICING ON THE WESTBURY TURN JUST BEFORE OPENING THE ROADS TO TRAFFIC

The entry lists contain the very cream and the rich milk of the American racing machines, and the Benz, Mercedes, Lancia and S. P. O. cars, which will represent foreign types in the contests, are well proven and rank with the speediest cars of the old world.

The American automobiles are classy. The Alco entry won its spurs on the Vanderbilt course and has proved itself to be a worthy representative of the six-cylinder idea in racing. The Pope-Hartford cars entered for the cup are racy-looking automobiles with long white bodies of the torpedo type, but finished off with a pyramid-shaped dustguard, which reduces wind pressure to a minimum. The National trio are machines that have won time and again on track, road and hill and will undoubtedly give a good account of themselves. The Lozier entry is the same car that won the National Stock Car Championship at Elgin.

The Simplex pair are well known for past performances and either has sufficient speed to lower the existing record for the



Businesslike Benz Car 3 ready for morning trial

Where Vanderbilt and Grand Prize Benzes are quartered

race even though the fortunes of racing might decree that neither should prove to be first over the tape. The three Marquette-Buicks have giant motors and great strength. Piloted by three veterans these cars are certain to be prominent in some stages of the race and will have to be considered in making calculations on the probable winner. The Apperson has won so often on the Pacific Coast that the Western contingent hold high hopes of its performance in the premier race. The Marmon couple, handled by a pair of wizards, have a gallant flight of speed and great endurance and have shown both on many a hard fought field. At Indianapolis and Atlanta on the speedways there were no racing automobiles with a license to treat this pair without consideration. The Jackson entry is a fast car with plenty of bottom; the Corbin is rather an unknown quantity in events of this kind, but from the fact that it will be handled by a particularly skilled driver, the performance of the car will be watched intensely by thousands. The Amplex is another unfamiliar name in racing events of the Vanderbilt Cup type, but the car has shown unusual power and a clean pair of heels in its practice work. The Stoddard-Dayton pair, one of which is the car that swept the boards at the Galveston, Tex., beach meet, are qualified to try conclusions with any kind of automobile entered for the cup. The Knox entry is the same car that Mr. Belcher has driven in numerous hill climbs and races this year and is sturdily able to give a good account of itself. The Oldsmobile pair, entered at a late stage, are very long-rangy looking cars, equipped with big motors and possessing brilliant speed. It has been a long time since the Oldsmobile has tried conclusions in road racing, but, judging from the past, there is no apparent reason why these cars should not be there or thereabouts at the finish. The Houpt-Rockwell car is a big powerful automobile and has been seen in distance races around New York on frequent occasions during the past season.

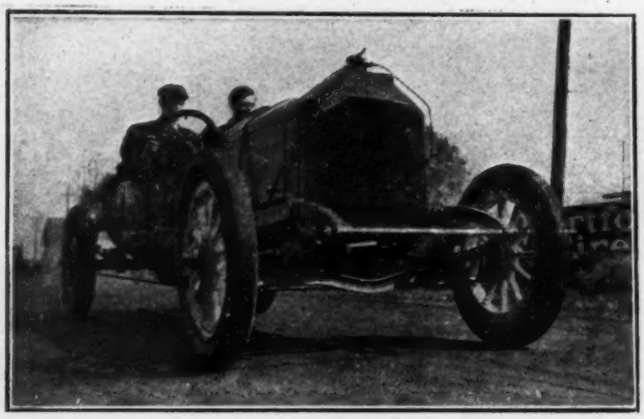
The Benz trio are built from the ground up. They have about as much power as the biggest machines entered for the contest and truly represent the last word of German construction. Their motors have a drumlike sound when in action that bespeaks power and their action is of watchlike precision and nicety. The Mercedes entered by Mr. Wishard is an old car, having been built in 1905. That it has power and speed and stability has been amply demonstrated this year in contests, and while it would seem unlikely that this car would win in such company, more unlikely things have happened in racing.

In the Massapequa trophy race the Cole "30" pair, to be driven by Bill and Harry Endicott, have been frequent contenders in racing events this year and are familiar to the public. The Lancia is a typical European racer qualified to enter this class.

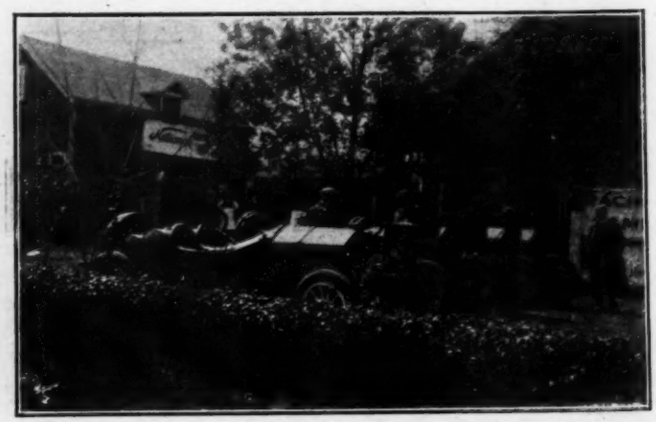
The Abbott-Detroit trio which will make a determined bid for victory in this event are business-like looking cars with bodies painted respectively red, white and blue. This is the initial racing event of any moment that these cars have attempted and their progress will be watched with interest.

In the Wheatley Hills trophy race there is a Marmon, similar to those entered in the Vanderbilt. Naturally the motor is smaller in order to come within the requirements of the conditions, but otherwise the car is identical with its big racing brothers in the main event. The Marion entry has won dash races and has made a creditable showing in distance events on the track. The Mercer pair have won racing events and have a pretty turn of speed, but their performance on the road-racing field is an unknown factor. The Corbin has done well in reliability runs and has speed and endurance. The S. P. O. entry holds the hour record at Brighton Beach and is a sweet-running, speedy car of French make. The Correja has proved a winner on the hills and is trying the gruelling road race for the first time.

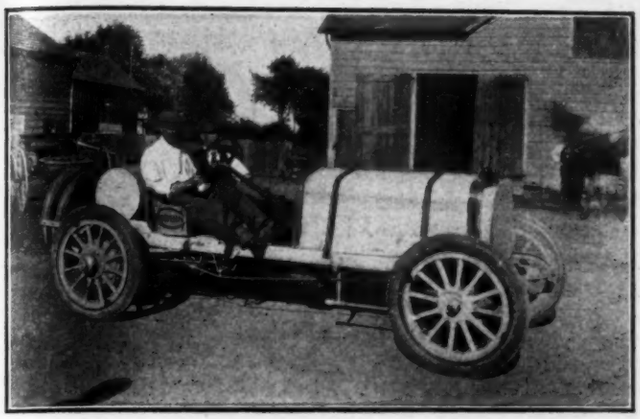
The practice so far has been fast, and of the record-breaking variety. On Friday morning the press representatives of



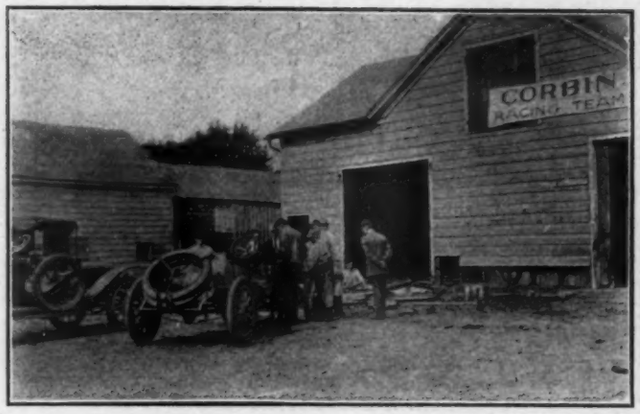
Graceful National Contestant coming head-on along Parkway



Headquarters of the National racing team, showing fast trio



Corbin Cup Car starting for its first spin on the course



Hicksville is the headquarters of the Corbin cars and drivers

New York were invited to be present to witness the first formal spins of the contesting cars. About a dozen were put through their paces. Dingley's Pope-Hartford made the circuit in 10:57.36, the fastest time of the morning. The Warner timing devices were installed Thursday night and the time made has some element of authenticity.

A damper was cast over the crowd by an accident by which it seemed likely that George Robertson, driver of the Benz car No. 1, and his passenger, Stephen Reynolds, of a New York daily newspaper, as well as the car, would be placed permanently out of commission. Robertson had consented to take the newspaperman around the course at speed. Approaching the Massapequa turn, where the course leaves the parkway and swings into the country road, the Benz was traveling at about 65 miles an hour. The turn is banked slightly, but Robertson steered too close to the top and as he realized the danger of going over with the momentum of the heavy car he shut down and tried desperately to stop the car but failed.

The car went over the edge just as Robertson yelled to Reynolds, "it's all off." Rolling over twice, the car righted itself while Reynolds was thrown thirty feet through the air. Witnesses say that Robertson rolled over with the car, but such a thing seems hardly possible. Both men were taken back to the grandstand and recovered consciousness in a few minutes when the driver was removed to the Nassau County Hospital. He was sorely bruised and cut about the face and his right side was jarred; it was feared that he might develop internal injuries. The latest reports from the hospital, however, indicate that his strong constitution and powerful muscular frame have been able to protect him from vital injury and he promises to be on hand for the big race. Mr. Reynolds was only severely shaken and jarred. The car looked to be a wreck, but close examination showed that a few hours' work would put it back in racing condition. After the accident Robertson at first announced that he would positively drive in the race, but later, at the request of his wife, he decided to withdraw. The car, which will be repaired, will probably be piloted by Franz Heim, a German, who formerly acted as a mechanician for Hemery and Hanriot.

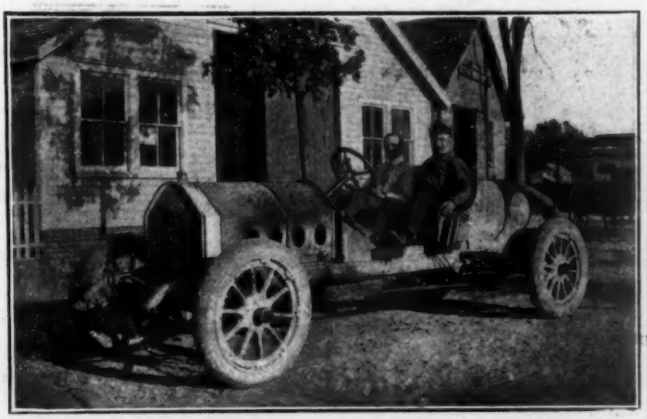
The fastest time made in practice on Friday was by Burman in a Marquette-Buick, who turned the course in 10:52.20. Other speedy trials were those of the Pope-Hartford (Fleming), 11 minutes flat; Corbin (Matson), 11:20, on his first trial at the course; Simplex (Mitchell), 11:08; Pope-Hartford (Dingley), 11:14; Benz (Hearne), 13:05; Alco (Grant), 11:14; National (Aitken), 11:29; Marmon (Dawson), 12:18.

Marquette-Buick No. 14, driven by Burman, made the fastest lap ever made in practice over the course on Saturday, when it negotiated the circuit in 10:15, eighteen seconds faster than the best of last year's practice. A good rain has fallen upon the course, rendering it faster and better than ever before, and new record figures for the course seem assured.

The Lancia entry, driven by William Knipper, was wrecked on the Westbury turn Monday morning by collision with Burman's Marquette-Buick. Knipper was hurled into the air, as was his mechanician, but neither was seriously hurt. The car was considerably damaged, but may be repaired in time to take part in the Massapequa race. It is doubtful whether Knipper will be able to drive. The Marquette-Buick, which was in nowise responsible for the accident, was not damaged outside of the loss of a hub cap.

The weighing-in process this year is being conducted at Mineola under the supervision of A. L. McMurtry. The cars for the Vanderbilt only have to be passed upon as to their piston displacement and brakes, but the entries in the sweepstakes are being given a rigid examination.

The Bosch Magneto Company and the Remy Magneto Company have each offered a prize of $500 for the winner of the Vanderbilt Cup.



Amplex entry in Vanderbilt, whose pulsing motor will be a feature

Where the Amplex is quartered near the scene of battle

Long white Pope-Hartford flyer which has dazzling speed

Pope-Hartford garage, showing the racing pair on the lawn

SPECIFICATIONS FOR THE CARS ENTERED

No.	Car	Entrant	Driver	Price	H. P.	BODY Type	BODY Seats	MOTOR Cylinders	MOTOR Bore	MOTOR Stroke	MOTOR Cyl. Cast	COOLING Radiator	COOLING Pump
1	Benz	Benz Auto Import Co.	Heim	$6250	40	Racing	2	4	5	6	Pairs	Tubular	Centrifugal
2	Benz	Benz Auto Import Co.	Hearne	6250	40	Racing	2	4	5	6	Pairs	Tubular	Centrifugal
3	Benz	Benz Auto Import Co.	Bruce-Brown	6250	40	Racing	2	4	5	6	Pairs	Tubular	Centrifugal
4	Alco	Amer. Locomotive Co.	Grant	6000	54.1	Racing	2	6	4½	5½	Pairs	H'comb.	Centrifugal
5	Pope-Hartford	Pope Mfg. Co.	Fleming	3000	36.1	Racing	2	4	4½	5½	Pairs	Tubular	Centrifugal
6	Pope-Hartford	Pope Mfg. Co.	Dingley	3000	36.1	Racing	2	4	4½	5½	Pairs	Tubular	Centrifugal
7	National	National Motor Vehicle Co.	Aitken	2500	40	Racing	2	4	5	5¹¹/₁₆	Pairs	H'comb.	Centrifugal
8	National	National Motor Vehicle Co.	Livingston	2500	40	Racing	2	4	5	5⅛	Pairs	H'comb.	Centrifugal
9	Lozier	Lozier Motor Co.	Mulford	4600	46.2	Racing	2	4	5⅜	6	Pairs	H'comb.	Centrifugal
10	Simplex	Simplex Automobile Co.	Mitchell	4500	52.9	Racing	2	4	5¼	5¼	Pairs	H'comb.	Centrifugal
11	Simplex	Simplex Automobile Co.	Beardsley	4500	52.9	Racing	2	4	5¼	5¼	Pairs	H'comb.	Centrifugal
12	Marquette-Buick	Marquette Motor Co.	L. Chevrolet	3950	57.6	Racing	2	4	6	5½	Pairs	Tub. or Cel.	Gear driven
14	Marquette-Buick	Marquette Motor Co.	Burman	3950	57.6	Racing	2	4	6	5½	Pairs	Tub. or Cel.	Gear driven
15	Marquette-Buick	Marquette Motor Co.	A. Chevrolet	3950	57.6	Racing	2	4	6	5½	Pairs	Tub. or Cel.	Gear driven
16	Apperson	Apperson Bros. AutoCo.	Hanshue	4250	52.9	Racing	2	4	5¼	5¼	Single	Tubular	Centrifugal
17	Marmon	Nordyke & Marmon Co.	Dawson	2750	32.4	Racing	2	4	4½	5	Pairs	Cellular	Centrifugal
18	Marmon	Nordyke & Marmon Co.	Harroun	2750	32.4	Racing	2	4	4½	5	Pairs	Cellular	Centrifugal
19	Jackson	Jackson Automobile Co.	Schiefler	2000	38	Racing	2	4	4¼	4¼	Single	Cellular	Syphon
20	Corbin	CorbinMotor Vehicle Corp'n	Matson	4000	48.6	Racing	2	6	4½	4½	Single	H'comb.	Centrifugal
21	Amplex	S. J. Wise & Co.	Jones	4500	41	Racing	2	4	5⅛	5	Pairs	Cellular	Centrifugal
22	National	Poertner Motor Car Co.	Disbrow	2500	40	Racing	2	4	5	5⅛	Pairs	H'comb.	Centrifugal
23	Stoddard-Dayton	U. S. Motor Co.	De Hymel	3000	40	Sp'str.	2	4	5	5½	Pairs	Tubular	Centrifugal
24	Stoddard-Dayton	U. S. Motor Co.	Harding	3000	40	Sp'str	2	4	5	5½	Pairs	Tubular	Centrifugal
25	Knox	Knox Automobile Co.	Belcher	4700	40	Racing	2	4	5	4½	Pairs	Cellular	Centrifugal
26	Mercedes	Spencer E. Wishard	Wishard		57.6	Racing	2	4	6	6½	Pairs	H'comb.	Centrifugal
27	Oldsmobile	Olds Motor Works	Stillman	3500	40	Racing	2	4	5	6	Pairs	H'comb.	Centrifugal
28	Oldsmobile	Olds Motor Works	Nolson	3500	40	Racing	2	4	5	6	Pair	H'comb.	Centrifugal
29	Houpt-Rockwell	H. S. Harkness	Limberg	5000	48.4	Racing	2	4	5½	6	Pairs	H'comb.	Centrifugal
30	American	American Motor Car Co.	Wallace	5000	52.9	R'ster.	2	4	5½	5½	Pairs	Tubular	Centrifugal
49	Columbia	U. S. Motor Co.	Stone	3300	38	Racing	2	4	4½	5½	Pairs	Cellular	Centrifugal

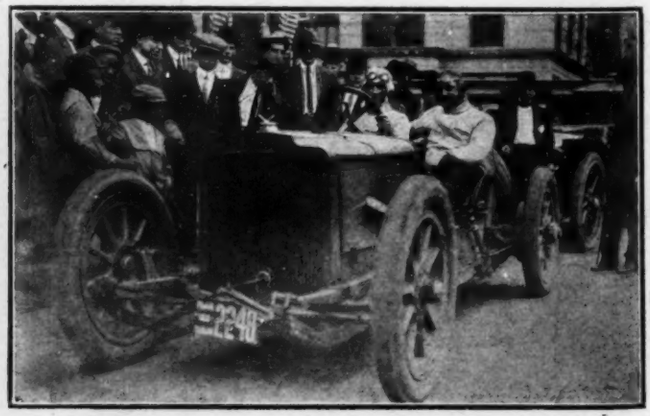
SPECIFICATIONS FOR THE CARS ENTERED

31	Marmon	Nordyke & Marmon Co.		2750	32.4	Racing	2	4	4½	5	Pairs	Cellular	Cent'fl.
32	Mercer	Mercer Automobile Co.	Sherwood	2250	27.2	Racing	2	4	4⅜	5	Pairs	H'comb.	Cent'fl.
33	S. P. O.	S. P. O. Automobile Co.	Juhasz	3250	24	Racing	2	4	3⅜	5½	Pairs	H'comb.	Cent'fl.
34	Correja	J. Mora Boyle	Mont. Roberts	1450	28.9	Racing	2	4	4½	5	Pairs	Cellular	Cent'fl.
35	Corbin	Corbin Motor Vehicle Corp'	Maisonville	2750	32.4	Racing	2	4	4½	4½	Single	H'comb.	Gear
36	Mercer	Mercer Automobile Co.	Bigelow	2250	27.2	Racing	2	4	4⅜	5	Pairs	H'comb.	Cent'fl.
37	Marion	Marion Motor Car Co.	Monson	1600	28.9	Racing	2	4	4½	4½	Pairs	Tubular	Cent'fl.
38	F. A. L. Car	W. H. Pearce	W. H. Pearce	1750	27.2	Racing	2	4	4½	5½	Pairs	Tubular	Cent'fl.
39	F. A. L. Car	J. F. Gilmore	J. F. Gilmore	1750	27.2	Racing	2	4	4½	5½	Pairs	Tubular	Cent'fl.

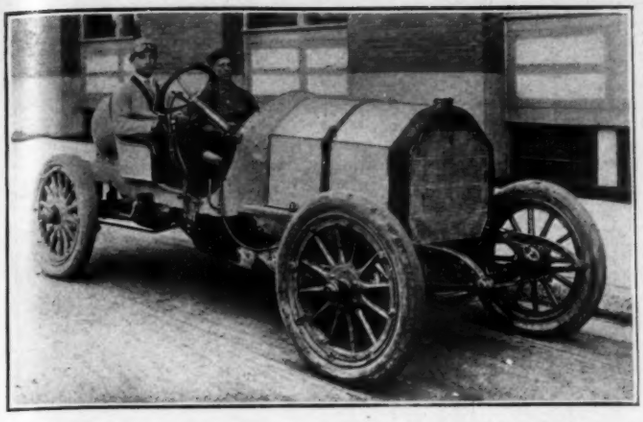
SPECIFICATIONS FOR THE CARS ENTERED

40	Cole "30"	Cole Motor Car Co.	Bill Endicott	1500	25.6	Racing	2	4	4	4	Pairs	Tubular	Sphon
41	Cole "30"	Cole Motor Car Co.	Harry Endicott	1500	25.6	Racing	2	4	4	4	Pairs	Tubular	Syhpon
42	Lancia	Hol-Tan Co.	Knipper	3500	25.6	Racing	2	4	4	4½	Block	H'comb.	Cent'fl.
43	Abbott-Detroit	Abbott Motor Co.	Lee Oldfield	1500	32.4	Racing	2	4	4	4½	Pairs	H'comb.	Cent'fl.
44	Abbott-Detroit	Abbott Motor Co.	Morty Roberts	1500	32.4	Racing	2	4	4	4½	Pairs	H'comb.	Cent'fl.
45	Abbott-Detroit	Abbott Motor Co.	Padula	1500	32.4	Racing	2	4	4	4½	Pairs	H'comb.	Cent'fl.

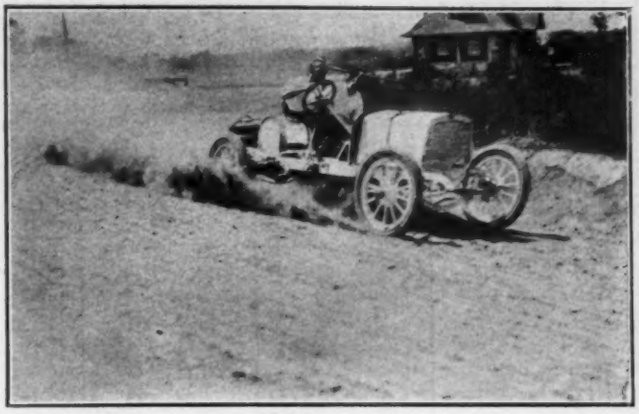
One of the Simplex cars in full flight on the county road



American Speedster, easily identified by square radiator



Stoddard-Dayton, champion of the Texas beach, and Indian pilot



Lozier, stock car championship winner at Elgin meet recently

FOR THE 1910 VANDERBILT CUP RACE

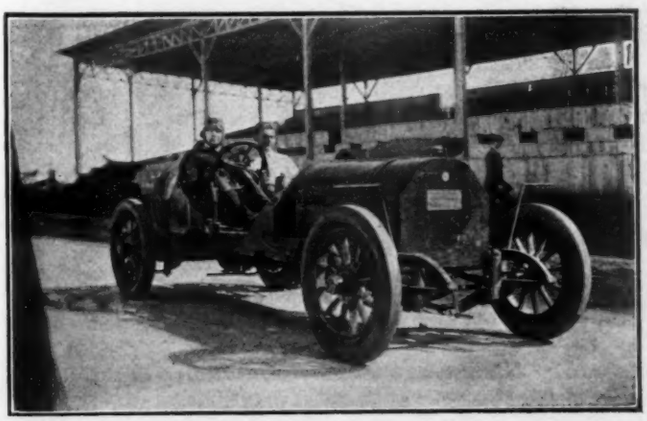
IGNITION				TRANSMISSION							BEARINGS				TIRES	
Magneto	Battery	Lubrication	Clutch	Type	Speeds	Location	Drive	Wheel-base	Tread	Frame	Crank-shaft	Trans-mis'on	Axle	Wght.	Front	Rear
Bosch	Storage	Pump	Cone	Selecti'e.	4	Amid'p..	Shaft	123	56	P. Steel	Plain	Ball	Ball		35x5	34x4
Bosch	Storage	Pump	Cone	Selecti'e.	4	Amid'p..	Shaft	123	56	P. Steel	Plain	Ball	Ball		35x5	34x4
Bosch	Storage	Pump	Cone	Selecti'e.	4	Amid'p..	Shaft	123	56	P. Steel	Plain	Ball	Ball		35x5	34x4
Bosch	Storage	Pump	Mul. disc	Selecti'e.	4	Amid'p..	2 Chain	126	55	Chan. st.	Plain	Ball	Ball	2730	36x4	36x4½
Bosch	Storage	Pump	Cone	Selecti'e.	4	Amid'p..	Shaft	124	56	St. & wood	Plain	Plain	Roller		35x4	35x5
Bosch	Storage	Pump	Cone	Selecti'e.	4	Amid'p..	Shaft	124	56	St. & wood	Plain	Plain	Roller		35x4	35x5
Bosch	Storage	Pump	Cone	Selecti'e.	3	Motor	Shaft	124	56	P. Steel	Plain	Ball	Roller	2650	34x4½	34x4½
Bosch	Storage	Pump	Cone	Selecti'e.	3	Motor	Shaft	124	56	P. Steel	Plain	Ball	Roller	2650	34x4½	34x4½
Bosch	Storage	Splash	Mul. disc	Selecti'e.	4	Amid'p..	Shaft	124	56	Alloy Steel	Ball	Ball	Ball	3400	36x4	36x5
Bosch	None	Pump	Mul. disc	Selecti'e.	4	Amid'p..	2 Chain.	124	56	P. Steel	2 pl. & b	Ball	Ball	3000	36x4	36x5
Bosch	None	Pump	Mul. disc	Selecti'e.	4	Amid'p..	2 Chain.	124	56	P. Steel	2 pl. & b	Ball	Ball	3000	36x4	36x5
Remy S	Dry	Pump	Disc	Selecti'e.	4	Amid'p..	Shaft	110	56	P. Steel	2 pl. & r	Ball	Ball		34½x4½	34½x4½
Remy S	Dry.	Pump	Disc	Selecti'e.	4	Amid'p..	Shaft	110	56	P. Steel	2 pl. & r	Ball	Ball		34½x4½	34½x4½
Remy S	Dry	Pump	Disc	Selecti'e.	4	Amid'p..	Shaft	110	56	P. Steel	2 pl. & r	Ball	Ball		34½x4½	34½x4½
Bosch	Storage	Pump	Con. bd	Selecti'e.	4	Motor	Chain	105	56	P. Steel	Plain	Ball	Ball	2700	34x4	35x4½
Magneto	Dry	Pump	Cone	Selecti'e.	3	Axle	Shaft	120	56½	P. Steel	Plain	Ball	Roller	2300	34x4	34x4
Magneto	Dry	Pump	Cone	Selecti'e.	3	Axle	Shaft	120	56½	P. Steel	Plain	Ball	Roller	2300	34x4	34x4
Splitd'f	Dry	Splash	Mul. disc	Selecti'e.	3	Motor	Shaft	105	56	P. Steel	Plain	Ball	Roller		34x4	34x4
Bosch	Storage	Pump	Cone	Selecti'e.	3	Amid'p..	Shaft	109	56	C.n. Steel	Pl. & b	Ball	Ball	2500	34x4	34x4
Bosch	Storage	Pump	Disc	Selecti'e.	3	Axle	Shaft	128	56½	C.n. Steel	5 Plain	Ball	Ball	2500	36x4	36x5
Bosch	Storage	Pump	Cone	Selecti'e.	3	Motor	Shaft	124	56½	P. Steel	Plain	Ball	Roller	2700	36x4	36x4
Bosch	Storage	Pump	Cone	Selecti'e.	3	Amid'p..	Shaft	106	56	P. Steel	3 Plain	Roller	Roller		36x4	36x4
Bosch	Storage	Pump	Cone	Selecti'e.	3	Amid'p..	Shaft	106	56	P. Steel	3 Plain	Roller	Roller		36x4	36x4
Bosch	Storage	Pump	3 Plate	Selecti'e.	3	Amid'p..	Shaft	106	56	P. Steel	5 Plain	Ball	Roller	2920	36x5	36x5
Bosch	Storage	Pressure	Coil	Selecti'e.	4	Axle	2 Chain	108	56	Krupp	Plain	Ball	Ball	2700	36½x3½	36½x5
Bosch	Dry	Pump	Cone	Selecti'e.	4	Motor	Shaft	124	56	P. Steel	Plain	Roller	Ball		36x5	36½x5½
Bosch	Dry	Pump	Cone	Selecti'e.	4	Motor	Shaft	124	56	P. Steel	Plain	Roller	Ball		36x5	36½x5½
Bosch	Storage	Pump	Mul. disc	Selecti'e.	4	Motor	Shaft	127	56	P. Steel	Plain	Ball	Ball	3000	36x4	36x5
Bosch	Storage	Pump	Cone	Selecti'e.	4	Frame	Shaft	112	56	P. Steel	3 Plain	Ball	Ball	2600	36x4½	36x4½
Bosch	Exide	Pump	Cone	Selecti'e.	3	Unit	Shaft	120	56	P. Steel	Plain	Ball	Roller		36x4	36x4

FOR THE WHEATLEY HILLS SWEEPSTAKES

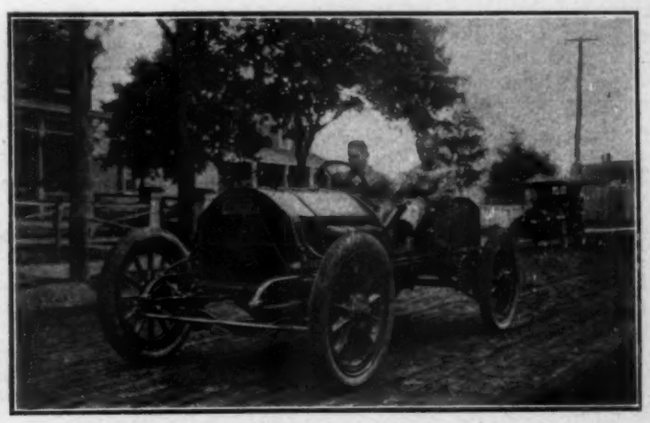
Magneto	Storage	Pump	Cone	Sel	3	Axle	Shaft	120	56½	P. steel	Plain	Ball	Roller	2300	34x4	34x4
Bosch	None	Pump	Mul. disc	Sel	3	S. frame	Shaft	108	56	P. steel	Plain	Ball	Ball	1900	32x3½	32x4
Bosch	None	Pump	Cone	Sel	3	Amid'p..	Shaft	103	56	P. steel	Plain	Ball	Ball	1800	32x4	32x4
U & H	None	Pump	Cone	Sel	3	Axle	Shaft	105	56	P. steel	Plain	Roller	Roller	1900	34x3½	34x3½
Bosch	Dry	Pump	Cone	Sel	3	Amid'p.	Shaft	108	56	Nick. st	Pl & b	Ball	Ball	2250	34x4	34x4
Bosch	None	Pump	Mul. disc	Sel	3	S. frame	Shaft	108	56	P. steel	Plain	Ball	Ball	1900	32x3½	32x4
Bosch	Dry	Pump	Mul. disc	Sel	3	Axle	Shaft	102	56	P. steel	Plain	Ball	Roller	1800	32x4	32x4
Magneto	Battery	Pmup	Cone	Sel	3	Frame	shaft	116	56	P. steel	3 Plain	Ball	Ball		34x3½	34x4
Magneto	Battery	Pump	Cone	Sel	3	Frame	shaft	116	56	P. steel	3 Plain	Ball	Ball		34x3½	34x4

FOR THE MASSAPEQUA SWEEPSTAKES

Spiltd'f	Dry	Pump	Cone	Sel	3	Motor	Shaft	108	56	P. steel	3pl		Roller	2000	34x3½	34x3½
Splitd'f	Dry	Pump	Cone	Sel	3	Motor	Shaft	108	56	P. steel	3pl		Roller	2000	34x3½	34x3½
Bosch	None	Pump	Mul. disc	Sel	4	Motor	Shaft	105	53	P. steel	3pl	Ball	Ball	1920	32x4	32x4
Bosch	Dry	Pump	Mul. disc	Sel	3	Amid'p.	Shaft	110	56	dr. st	Plain	Ball	Ball	2000	34x3½	34x3½
Bosch	Dry	Pump	Mul. disc	Sel	3	Amid'p.	Shaft	110	56	dr. st	Plain	Ball	Ball	2000	34x3½	34x3½
Bosch	Dry	Pump	Mul. disc	Sel	3	Amid'p.	Shaft	110	56	dr. st	Plain	Ball	Ball	2000	34x3½	34x3½



Long-hooded, black Alco; winner of last year's Vanderbilt



Hope of the Pacific Slope is centered on Apperson Jack-Rabbit

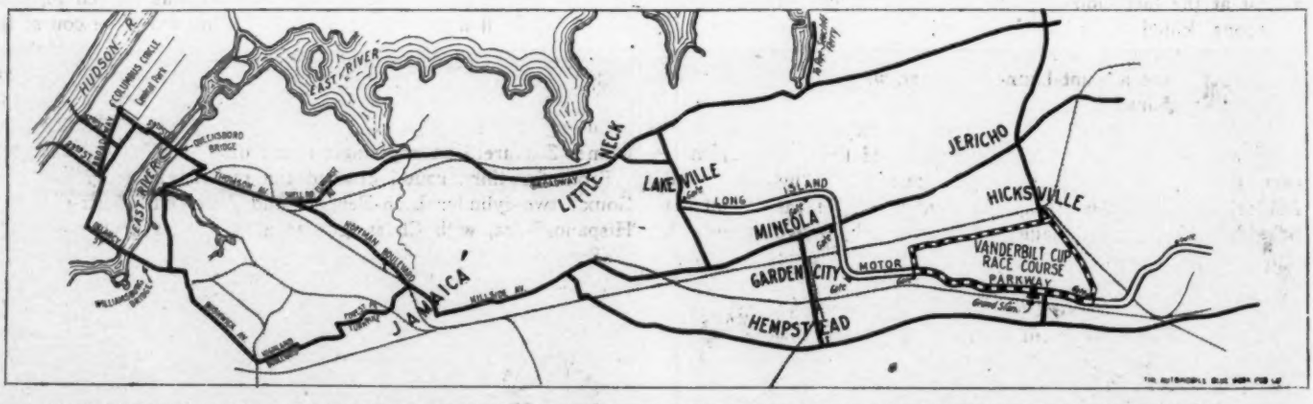
TABLE SHOWING THE SPEED IN MILES PER HOUR OF AN AUTOMOBILE GOING AROUND THE COURSE OF THE VANDERBILT CUP RACE IN FROM 9 TO 13 MINUTES

(Course is 12.64 miles long—5.15 miles cemented parkway; 7.49 miles oiled macadamized roads. Fastest time made on it, 8 minutes 56½ seconds, on October 30th, 1909)

Min.	M.P.H.	Min.	M.P.H.	Min.	M.P.H.	Min.	M.P.H.	Min.	M.P.H.	Min.	M.P.H.	Min.	M.P.H.
9:00	84.27	9:35	79.14	10:09	74.72	10:43	70.77	11:18	67.11	11:52	63.91	12:26	61.00
9:01	84.11	9:36	79.00	10:10	74.60	10:44	70.66	11:19	67.01	11:53	63.82	12:27	60.92
9:02	83.95	9:37	78.86	10:11	74.47	10:45	70.55	11:20	66.91	11:54	63.73	12:28	60.83
9:03	83.80	9:38	78.73	10:12	74.35	10:46	70.44	11:21	66.82	11:55	63.64	12:29	60.75
9:04	83.65	9:39	78.59	10:13	74.23	10:47	70.33	11:22	66.72	11:56	63.55	12:30	60.67
9:05	83.49	9:40	78.45	10:14	74.11	10:48	70.22	11:23	66.62	11:57	63.46	12:31	60.59
9:06	83.34	9:41	78.32	10:15	73.99	10:49	70.11	11:24	66.53	11:58	63.38	12:32	60.51
9:07	83.19	9:42	78.19	10:16	73.87	10:50	70.00	11:25	66.43	11:59	63.29	12:33	60.43
9:08	83.04	9:43	78.05	10:17	73.76	10:51	69.90	11:26	66.33	12:00	63.20	12:34	60.35
9:09	82.89	9:44	77.92	10:18	73.63	10:52	69.79	11:27	66.24	12:01	63.11	12:35	60.27
9:10	82.73	9:45	77.78	10:19	73.51	10:53	69.68	11:28	66.14	12:02	63.02	12:36	60.19
9:11	82.58	9:46	77.65	10:20	73.39	10:54	69.58	11:29	66.04	12:03	62.94	12:37	60.11
9:12	82.43	9:47	77.52	10:21	73.27	10:55	69.47	11:30	65.95	12:04	62.85	12:38	60.03
9:13	82.28	9:48	77.39	10:22	73.16	10:56	69.37	11:31	65.85	12:05	62.76	12:39	59.95
9:14	82.14	9:49	77.26	10:23	73.04	10:57	69.26	11:32	65.76	12:06	62.68	12:40	59.87
9:15	81.99	9:50	77.13	10:24	72.92	10:58	69.15	11:33	65.66	12:07	62.59	12:41	59.80
9:16	81.84	9:51	76.99	10:25	82.81	10:59	69.05	11:34	65.57	12:08	62.51	12:42	59.72
9:17	81.69	9:52	76.86	10:26	72.69	11:00	68.94	11:35	65.47	12:09	62.42	12:43	59.64
9:18	81.54	9:53	76.73	10:27	72.57	11:01	68.84	11:36	65.38	12:10	62.33	12:44	59.56
9:19	81.40	9:54	76.60	10:28	72.46	11:02	68.74	11:37	65.29	12:11	62.25	12:45	59.48
9:20	81.26	9:55	76.48	10:29	72.34	11:03	68.63	11:38	65.19	12:12	62.16	12:46	59.40
9:21	81.12	9:56	76.35	10:30	72.23	11:04	68.53	11:39	65.10	12:13	62.08	12:47	59.33
9:22	80.97	9:57	76.22	10:31	72.11	11:05	68.43	11:40	65.01	12:14	61.99	12:48	59.25
9:23	80.82	9:58	76.09	10:32	72.00	11:06	68.33	11:41	64.91	12:15	61.91	12:49	59.17
9:24	80.68	9:59	75.97	10:33	71.89	11:07	68.22	11:42	64.82	12:16	61.83	12:50	59.10
9:25	80.54	10:00	75.84	10:34	71.77	11:08	68.12	11:43	64.73	12:17	61.74	12:51	59.02
9:26	80.39	10:01	75.71	10:35	71.66	11:09	68.02	11:44	64.64	12:18	61.66	12:52	58.94
9:27	80.25	10:02	75.59	10:36	71.55	11:10	67.92	11:45	65.54	12:19	61.58	12:53	58.87
9:28	80.11	10:03	75.46	10:37	71.43	11:11	67.81	11:46	64.45	12:20	61.49	12:54	58.79
9:29	79.97	10:04	75.34	10:38	71.32	11:12	67.71	11:47	64.36	12:21	61.41	12:55	58.71
9:30	79.83	10:05	75.21	10:39	71.21	11:13	67.61	11:48	64.27	12:22	61.33	12:56	58.64
9:31	79.69	10:06	75.09	10:40	71.10	11:14	67.51	11:49	64.18	12:23	61.24	12:57	58.56
9:32	79.55	10:07	74.96	10:41	70.99	11:15	67.41	11:50	64.09	12:24	61.16	12:58	58.49
9:33	79.42	10:08	74.84	10:42	70.88	11:16	67.31	11:51	64.00	12:25	61.08	12:59	58.41
9:34	79.28					11:17	67.21					13:00	58.34

The Vanderbilt Cup race this year will be decided in large measure by the driving and such a galaxy of talent in that line has seldom been assembled in a single contest. There is not a single man who will handle the wheel in the cup race and the two sweepstakes who is not an artist. Most of them are veterans who have been in competition for years. Some of them are pioneers of the automobile racing profession and all have served their apprenticeship of hard, conscientious work to master the details of contest work. Robertson, Louis Chevrolet, Burman, Harroun, Matson, Montague, Roberts, Bill Endicott and Disbrow are in the front rank among the veterans, despite the fact that several of the above-named are smooth of brow and youthful, judged by the mere standard of years. Hearne, Grant, Fleming, Dingley, Aitken, Livingston, Dawson, Hanshue, Basle, and Knipper, are all masterly drivers whose names are associated with winners and whose knowledge of cars and speeds is intuitive. Bruce-Brown, Beardsley, and Wishard, have been amateurs so recently that one is almost obliged to class them together. In fact, Mr. Wishard's amateur standing is still debatable, despite the money prizes that await the winner of this contest. However, it would be difficult to pick out three more skillful drivers than this trio. Mitchell, Mulford, Arthur Chevrolet, Schiefler, Belcher, Juhasz, and Stillman, represent everything that goes to make up first-rate drivers. They all have strength, daring, and knowledge of track, road and the automobile, and if the winning of the race depends upon nerve and skill of the driver, any of them may win. De Hymel, the Aztec Indian; Jones, the 19-year-old youth, who will pilot the Amplex; Maisonville, the Corbin pilot in the Wheatley Hills; Sherwood of the Mercer; Oldfield, Abbott-Detroit, and his associates in the Massapequa, Mortimer Roberts and V. Padula, and Harry Endicott, and Limberg, are not so well known in the metropolitan racing field. De Hymel proved a world beater in Texas and the South. He is said to be as cool as Chevrolet and as easy as Lancia and to be as ready to take chances as Robertson or Harroun. Oldfield has driven in many races and is a strong, masterful youth with a keen knowledge of racing and contest work. The others have frequently driven in contests of various sorts and are competent men in the widest sense of the word.

Vanderbilt Cup cars and several others entered in the two minor sweepstake events were given moderately fast work Wednesday morning. There was nothing sensational about the time



MAP SHOWING THE BEST ROUTES BETWEEN GREATER NEW YORK AND VARIOUS POINTS ON THE COURSE
(Reproduced by permission of The Automobile Blue Book)

made except that the Pope-Hartford (Fleming) was sent around the course in 10:20 again. The principal other trials were as follows: National (Disbrow) 11:19; National (Aitken) 11:07; National (Livingston) 10:31; Marquette-Buick (Burman) 11:13; Benz (Heim) 11:14; Mercedes (Wishart) 11:21; Jackson (Scheifler) 12:03; Marquette-Buick (A. Chevrolet) 11:10; Marmon (Harroun) 13:15; Columbia (Stone) 11:07; Oldsmobile (Stillman) 11:56; Corbin (Matson) 17:11.

The Amplex (Jones) met with a mishap that may prevent the competition of the car. While going at a lively clip on the backstretch, the driver sought to avoid a motorcycle just at the close of practice and was obliged to make such a sudden turn that he dropped a torsion tube which resulted in some damage to the car. A hurry order has been sent to the factory for repair parts and the announcement has been made that a determined effort will be made to have the car on the starting line.

The official weighing-in will be completed Thursday night, after which the drawing for official race numbers will be held.

The officials of the race are as follows: Referee, William K. Vanderbilt, Jr.; judges, Henry Sanderson, Colgate Hoyt, Dave Hennen Morris, Robert Lee Morrell, and Samuel M. Butler; technical committee, A. L. McMurtry, Henry Souther and Alexander Churchward; A. A. A. representative, Frank G. Webb; assistant to the president, A. R. Pardington.

How to Reach the Grand Stand

Starting from Broadway, run east on Fifty-seventh street; turn left on Second avenue and right across Queensboro Bridge (toll 10 cents). At end of bridge turn right into Crescent street and at end of street turn sharp left into Nott avenue, crossing Jackson avenue. Curve slightly left over Thompson avenue railroad viaduct; then straight on into Hoffman Boulevard. At four-corners garage on left turn left into Hillside avenue direct through Jamaica. At iron sign post (four-corners) turn right on Queens road and left at end of road (15.0 miles). Take next diagonal right through Queens and Hempstead, straight road. Turn left (33.4 miles) to Grand Stand Long Island Motor Parkway (33.6 miles).

Coupe des Voiturettes

REMARKABLE TIME MADE OVER THE 282.4-MILE COURSE BY SMALL CARS, SOME OF WHICH DID 84 MILES AN HOUR ON THE STRAIGHTAWAY

BOULOGNE-SUR-MER, Sept. 17—An average speed of 55.7 miles an hour for a distance of 282.4 miles of hilly, winding road; one round of 23 1-2 miles officially covered at the rate of 58.7 miles an hour; an unofficial record of 66.4 miles an hour for another round; a speed of not less than 84 miles an hour on the straightaway—all this sounds like going fast. And it is not a revival of the Grand Prix race with 160-horsepower monsters that is under discussion, but merely the officially controlled speeds of the fastest cars in the Coupe des Voiturettes, where the bore of the little four-cylinder cars was not allowed to exceed 2 1-2 inches, or if you like to have it in accurate decimals, 2.559 inches.

If these little cars had been possible six years ago George Heath would certainly not have won the race for the Vanderbilt Cup. It is doubtful even if Louis Wagner would have held the trophy for the Darracq company, for 55.7 miles at hilly Boulogne is equal to more than 61.43 miles on level Long Island; it is equally doubtful if Sisz could have held his own on the straightaway Sarthe course against these terrible pigmies.

The race for the sixth annual Coupe des Voiturettes was one of the finest exhibitions of speed ever seen in France, and was particularly welcome after a monotonous series of aviation meetings. The seventeen entrants were reduced to fourteen almost at the last moment, the most serious loss being that of Giuppone, killed while practicing on a Lion-Peugeot only two days before the race; a Tribet smashed its clutch coming to the starting line, and a Saint-Lanne-Martinet, with a De Dion motor, quietly disappeared.

From the outset it was evident that the interest of the race lay between the Spanish Hispano-Suiza team of three four-cylinder cars, and the French Lion-Peugeot pair driven by Goux and Boillot. The Frenchmen were believed to be the faster, but the Spaniards had the advantage of being remarkably well prepared, their cars having been on the road for almost six months before the race. The others, although doing interesting work, were forgotten in the excitement of the Franco-Spanish duel.

A morning fog that rolled in from the sea held the start back from 7 to 8 o'clock. Then the cars were sent away at intervals of one minute, the course to be covered being one of 23 1-2 miles, comprising several 10 per cent. grades and numerous sharp turns, three of them being hairpins. Starting second, Zuccarelli finished first on the initial round in 25 minutes 35 seconds, easily beating last year's record of 29.28 over the same course. There was a surprise when the next car to roar by was Boillot's four-cylinder Lion-Peugeot which had started twelfth and passed the Hispano-Suiza, a Calthorpe, a D. S. P. L., a Corre La Licorne and a De Bazelaire. With a standing start Boillot had averaged 57 miles an hour. But there was still faster work, Goux coming round the course on his two-cylinder Lion-Peugeot in 24 minutes 33 seconds, or 17 seconds faster than his team mate.

All interest was now centered on the Lion-Peugeot and the Hispano-Suiza cars. Boillot led at the end of the second round, time 49 minutes 26 seconds, compared with 58.38, last year's record. At the end of the third round Goux was ahead, with Boillot 15 seconds behind him, and the whole Spanish team clinging on with grim determination. Goux made a desperate effort to shake the foreigners off, accomplishing his third round in 25 minutes 2 3-5 seconds, or an average of 58.7 miles an hour, this remaining the official record for the day. It was soon evident that Boillot could not get first place, for after two rounds his motor began to heat, necessitating a stoppage at the end of each round to take on water. But this did not make him spare his car; as he came down the gentle slope to the stands he drew up quickly and quietly without the least skidding of the wheels; in a fraction of a second the mechanic had the cap off the radiator, a cloud of steam shot out, more water was poured in, and almost before it was realized he was hurdling down the course to the graveyard turn, three-quarters of a mile away. Making allowance for the stoppage to take on water, he covered one of his rounds at the rate of 66.4 miles an hour, and his official time, including the stoppage, was faster than that realized by the winner Zuccarelli on any single round of the course.

From the third round onward the real struggle lay between Goux's two-cylinder Lion-Peugeot and Zuccarelli's four-cylinder Hispano-Suiza, with Chassaigne as a dangerous runner-up, and Boillot a violent sprinter unable to make up the time lost through his frequent but brief stops. At the end of six rounds, half distance, Goux had a lead of nearly two minutes on the Spaniard Zuccarelli, but it was not sufficient to assure him the victory, for on the next round he punctured twice, had to change with fixed rims and allowed Zuccarelli to get a lead of six minutes. On the eighth round the lead was pulled down to five minutes; on the ninth round it had been dropped to four minutes; on the tenth round it was still four minutes, and there remained two rounds

to be covered, on each of which the Frenchman must gain two minutes in order to beat the Spaniard. Goux might have done it had he had ordinary luck with its tires, but on the eleventh round he punctured three times and occupied 38 minutes 5 seconds on the course which he had previously been covering in an average of 24 1-2 minutes. This lost him the race, for although Zuccarelli, who never once punctured, was held up by reason of a leak in his petrol tank, he got round the course in 29 minutes 3 seconds. Goux went for all he was worth on the last lap, but another puncture, the breakage of a shock absorber and the jumping of one of his driving chains from its sprocket held him down to 29 minutes 8 seconds for the round. Zuccarelli had won the race with a margin of exactly 17 minutes, had beaten last year's record established by Giuppone on a single-cylinder Lion-Peugeot by almost an hour, and had shown an average speed of 55.7 miles an hour.

With Boillot going lame, Chassaigne had not much difficulty in bringing his Hispano-Suiza home third with a margin of seven minutes. Collomb, who had run a very even course, brought his Corre La Licorne home fifth, but would certainly have been beaten by his teammate Levy had this car not been held back by frequent punctures, so frequent indeed that on one occasion it was necessary to wait an hour until fresh inner tubes were brought from the tire station. Pilliverde finished sixth on the Hispano-Suiza, thus securing the team prize for his firm. Levy on the Corre La Licorne came home too late to be timed.

One of the surprises of the meeting was the failure of the English team to get a single car home. Fred Burgess skidded on a turn, buckled a wheel, skidded again a few minutes later and broke his front axle. Garfield, also on a Calthorpe, lost the oil plug out of the base of his crankcase and was not long in seizing up. Frank Lewis, after covering half the distance, had the oil tank in the base of his crank chamber cracked by a flying stone, lost his lubricant and eventually seized. No. 1 Tribet car broke its crankshaft, an accident that was not unexpected, for it was known that a mistake had been made in the material supplied. Vallee on the four-cylinder D. S. P. L. overturned after covering one round; a companion car, after holding the road badly for nine rounds, withdrew from the fray. De Bazelaire, who had started with a stripped runabout, his racer having been wrecked a few days previously, averaged 40 miles an hour for half a dozen rounds, then made for home.

The feature of the cars entered for the race was the proportion of four-cylinder motors. In all the previous races single-cylinder cars have predominated, and have never been beaten. On this occasion there was 13 four-cylinder cars, one two-cylinder-motor, and three one lungers. Hispano-Suiza presented three four-cylinder models with the maximum bore of 2 1-2 inches and a stroke of 7 8-10 inches; this gives a ratio of stroke to bore of practically 3.07. The Spanish engineers had been satisfied to develop their motor on standard lines. Thus the four cylinders were a single casting, with valves on opposite sides, the diameter of the valves being considerable, but the valve chambers reduced to the smallest possible area. Timing gears were enclosed at the forward end of the motor, the high-tension Bosch magneto being driven off the right-hand side, and the water pump off the left-hand side. The head of the cylinders was dome shaped, the steel pistons had flat heads, were of unusual length and fitted with three compression rings. Tubular connecting-rods were employed. The crankshaft was carried in three ball-bearings. B. N. D. steel was employed for crankshafts, camshafts, connecting-rods, etc. The motor did its best work at 2,300 revolutions a minute, when it developed 45 horsepower, with an average lineal piston speed of 15 meters a second, or almost 3,000 feet a minute. Lubrication was of the forced feed type by a pump worked off the extremity of the intake camshaft, and the pressure on the gasoline was also maintained by an air pump worked off the motor. The drive was taken through a multiple disc clutch to a three-speed gear box, and by propeller shaft to the rear live axle, the number of teeth in the rear axle being 17 and 47. Rudge-Whitworth dismountable wire wheels were used, in conjunction with Michelin tires of 880 by 90. Total weight of each of the three cars, without oil or gasoline, was 1,455 pounds.

No attempt was made by the Hispano-Suiza engineers to gain speed by reducing head resistance. The cars carried large square honeycomb radiators, the bonnet stopped dead at the dash, and the rear of the two seats was a sloping platform on which a spare wheel was mounted.

The Lion-Peugeot people, who previously have run with two single-cylinder cars and one twin-cylinder V motor, this year produced entirely new models having the defect of not being thoroughly tuned up. Detail information regarding the motors is most jealously guarded. The cars were brought to Boulogne at night, while they were being weighed in a big screen was placed round them, and before the mechanics would dismount the cylinders the hall had to be cleared of all but officials. During the race Boillot had to lift his bonnet twice in the presence of the crowd in order to flood his carbureter, but he had it on again in a fraction of a second. When the race was over he placed a man in charge of the car with orders that the bonnet should not be raised, and to be doubly sure, ate his lunch in such a position that he could watch the machine all the time.

Goux's two-cylinder Lion-Peugeot motor was half exposed through the cut-away bonnet, and as this covering was abandoned during the race, a fair opportunity was given of examining the mechanical features. The two cylinders are cast separately and mounted in V-shape, with only a slight inclination from the vertical on an aluminum crankcase. Cylinder bore is the maximum of 80 millimeters (3.1 inches) and stroke is 11 inches. This gives a ratio of 3 1-2 to 1 stroke to bore. This motor, which has been designed by the firm's chief engineer, M. Michaud, differs considerably from the previous racing models produced for the firm by Boudreau-Vernet. There are three valves per cylinder, the intake being mounted vertically in the head of the cylinder, having a diameter of 2.4 inches and a flat seat, while the two exhausts are carried horizontally, one stem projecting toward the radiator, and the other toward the dashboard.

The second Lion-Peugeot, driven by Boillot, had four cylinders in V forming a single casting, their dimensions being 2 1-2 inches bore by 10.2 inches stroke; this is a ratio of 4 to 1, the highest employed for any motor yet produced in Europe. Theoretically this motor ought to have won the race, for it developed 45 horsepower on the bench, and was undoubtedly the fastest on the straightaway. Boillot lost a certain amount of time through the breakage of his gasoline feed pipe and the disarrangement of his foot brake. But the real cause of his defeat was overheating

TABULATED RESULT OF COUPE DES VOITURETTES RACE

Total distance 282.4 miles

Average 55.7 miles an hour.

		h.	m.	s.
1.	Zuccarelli, Hispano-Suiza	5	04	50
2.	Goux, Lion-Peugot	5	21	50
3.	Chassaigne, Hispano-Suiza	5	30	45
4.	Boillot, Lion-Peugeot	5	37	36
5.	Collomb, Corre La Licorne	6	28	16
6.	Pilliverde, Hispano-Suiza	6	37	[illegible]
7.	Levy, Corre La Licorne	not timed		

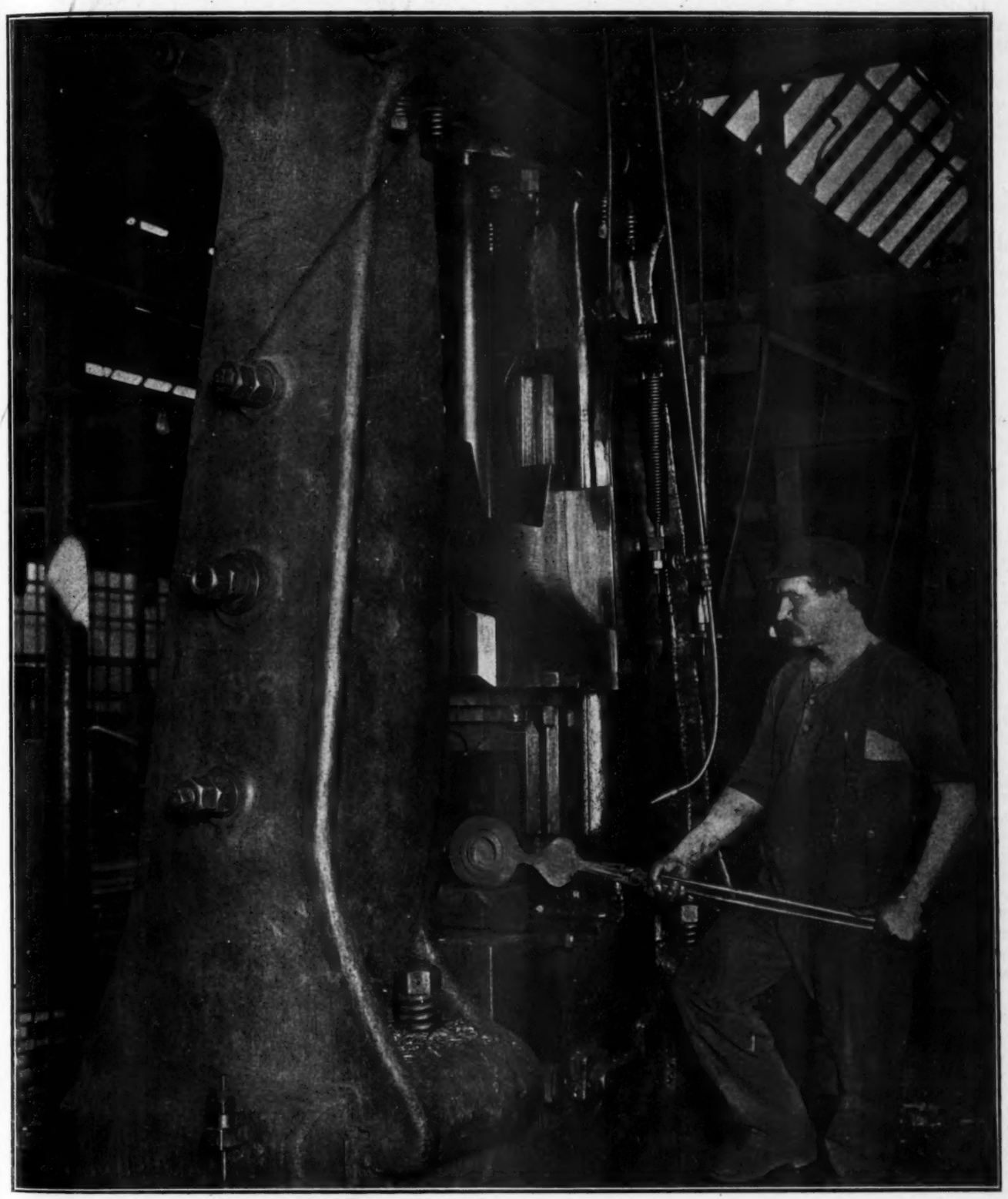
Fastest round, Goux, Lion-Peugeot, average 58.7 miles.

CHARACTERISTICS OF CARS

Car	Cylinder	Bore & Stroke	H. P.	Clutch	Drive	Transmission	Ignition	Carbureter	Tires
Hispano-Suiza	4	2½ x 6½	40	Disc	Shaft	4 Selective	Magneto	Claudel	810 x 90
Lion-Peugot	2	3.1 x 10.2	38	Cone	Chain	4 Selective	2 Magnetos	Claudel	810 x 90
Lion-Peugeot	4	2½ x 11	45	Cone	Chain	4 Selective	Magneto	Claudel	810 x 90
Corre La Licorne	1	3.9 x 11.8	38	Cone	Shaft	3 Progressive	Magneto	Zenith	810 x 90
Corre La Licorne	1	3.9 x 1	34	Cone	Shaft	4 Selective	Magneto	Zenith	810 x 90
Calthorpe	4	2½ x 6.6	38	Disc	Shaft	3 Selective	Magneto	Zenith	810 x 90
De Bazelaire	4	2½ x 6.2	30	Disc	Shaft	3 Selective	Magneto	Zenith	810 x 90
Tribet	4	2½ x 7	35	Cone	Shaft	3 Selective	Magneto	Zenith	810 x 90
D. S. P. L.	4	2½ x 5.5	36	Disc	Shaft	3 Selective	Magneto	Zenith	810 x 90

Engineering Section

DEVOTED TO THE DISCUSSION OF ENGINEERING PHASES OF AUTOMOBILING, INCLUDING DESIGNING AND CONSTRUCTION FEATURES OF PRODUCTS, AND INFORMATION TO AUTOISTS



TO AVOID USING INFERIOR CASTINGS ENORMOUS HAMMERS ARE NECESSARY—SCENE AT RAMBLER PLANT

Auto as Locomotive

WILLIAM D. ENNIS, M.E., OF BROOKLYN POLYTECHNIC INSTITUTE, CONSIDERS THE MOTOR CAR FROM THE STANDPOINT OF THE LOCOMOTIVE DESIGNER

INTRODUCTORY.—The automobile is a train comprising a single self-propelled car running on the ground instead of on rails. It is the purpose of this paper to consider the motor car from the standpoint of the locomotive designer, rather than as a vehicle or a power engine, and to discuss the proportions of a typical example from this standpoint.

The specific automobile to which reference will be made is a 1907 Stoddard-Dayton, Model F, having a four-cylinder, four-cycle motor rated at 30 to 35 horsepower, with selective type transmission, three speeds forward and one reverse. The cylinders are 4 5-8 by 5-inch, tires nominally 34 by 4-inch, weight of empty car 3,025 pounds (54 per cent. on rear wheels), and gear ratios between engine and rear wheels of 11, 5 and 3 to 1 running forward and 14 to 1 reversed. This car was in 1909 subjected to a series of interesting power measurements by Messrs. C. Hidalgo and J. Harold McCreery on the testing floor of the Automobile Club of America. It has been the writer's privilege to examine the data obtained by these gentlemen.

Tractive Force

The ability of any locomotive to propel depends not upon its horsepower, but on the *tractive* or pulling force which it can exert. Work, or horsepower, is a formation both of the tractive force and the speed. A motor might have almost unlimited horsepower without sufficient tractive force to meet ordinary road conditions. To be satisfactory, it must exert the proper amounts both of tractive force and horsepower, the latter depending (after the former is fixed) solely on the speed. In Fig. 1 we have the simple case of one single-acting cylinder directly cranked to a wheel without intermediate gearing. The wheel makes the same number of revolutions per minute as the piston.

Let

s = stroke of piston in inches,
P = average pressure continuously maintained on the piston in pounds per square inch,
d = diameter of piston in inches,
D = diameter of wheel in inches,
F = tractive or pulling force that could be exerted at the wheel rim, in pounds; the force that would be measured by a spring balance connected tangentially at the rim of the wheel.

Remembering that work is equal to force times distance through which the force is applied, we proceed:

$$\text{Area of piston} = \frac{\pi}{4} d^2 \text{ square inches,}$$

$$\text{Total average pressure on piston} = \frac{\pi}{4} d^2 P \text{ pounds,}$$

$$\text{Work at piston per revolution} = 2s \times \frac{\pi}{4} d^2 P = \frac{\pi}{2} d^2 sP \text{ inch-pounds.}$$

Let W be the work done at the wheel surface per revolution $= \pi DF$. Then, if there is no friction loss between piston and wheel,

$$W = \pi DF = \frac{\pi}{2} d^2 sP \text{ and } F = \frac{d^2 sP}{2D}.$$

Suppose the speeds of wheel and piston to be different, because of intermediate gearing: let N denote the revolutions per minute of the wheel, and n those of the piston. We then have,

$$\text{Work at piston per minute} = \frac{\pi}{2} d^2 nsP \text{ inch-pounds,}$$

$$\text{Work at wheel per minute} = NW = N\pi DF = \frac{\pi}{2} d^2 nsP \text{ and}$$

$$F = \frac{d^2 nsP}{2ND}.$$

In this connection, P denotes the average pressure continuously maintained. In a four-cycle engine there is perceptible pressure on the piston during one stroke only in the four; this when averaged over a single stroke is called the mean effective pressure; it is the average height of the indicator diagram, and its value is four times that of P. But if the engine has four cylinders we may obtain four times the value of F that is given by our formula, or P may be put equal to the mean effective pressure, the maximum of which for gasoline automobile engines will be not far from 100 pounds. For the car under consideration d = 4⅝, s = 5, D (diameter of wheels) = 34; letting P = 100 and taking $\frac{n}{N} = 11$ (first gear), we have

$$F = \frac{(4\frac{5}{8})^2 \times 11 \times 5 \times 100}{2 \times 34} = 1730 \text{ pounds.}$$

For second and third gears, respectively, we obtain

$$F_2 = \frac{(4\frac{5}{8})^2 \times 5 \times 5 \times 100}{2 \times 34} = 786 \text{ pounds,}$$

$$F_3 = \frac{(4\frac{5}{8})^2 \times 3 \times 5 \times 100}{2 \times 34} = 472 \text{ pounds.}$$

These are maximum theoretical values, assuming a perfect spark adjustment and no throttling, and are not realized in practice. Assuming them to be realized, however, what are the corresponding limits of speed? At 100 pounds mean effective pressure the horsepower at the pistons is

$$\frac{100 \times \pi \frac{d^2}{4} \times 2sn}{12 \times 33{,}000} = \frac{100 \times 3.1416 \times 4\frac{5}{8} \times 4\frac{5}{8} \times 2 \times 5 \times n}{4 \times 12 \times 33{,}000} = 0.0424\,n.$$

Suppose the maximum speed of the pistons at which full mean effective pressure is attainable to be 900 r.p.m. The horsepower for this value of n is

$$0.0424 \times 900 = 38.16.$$

The horsepower at the wheel rim is

$$\frac{34 \times \pi \times F \times N}{12 \times 33{,}000} = 0.00027\,FN.$$

The values of N for the three gears are:

$$N_1 = 900 \div 11 = 81.8$$
$$N_2 = 900 \div 5 = 180.$$
$$N_3 = 900 \div 3 = 300.$$

Introducing the proper values of F, we have as the wheel rim horsepowers,

$$\left.\begin{aligned} HP_1 &= 0.00027 \times 1730 \times 81.8 \\ HP_2 &= 0.00027 \times 786 \times 180 \\ HP_3 &= 0.00027 \times 472 \times 300 \end{aligned}\right\} = 38.16.$$

If we put horsepower at wheel rim = 38.16, we have

$$38.16 = 0.00027\,FN,$$
$$N_1 = 38.16 \div (0.00027 \times 1730) = 81.7$$
$$N_2 = 38.16 \div (0.00027 \times 786) = 179.7$$
$$N_3 = 38.16 \div (0.00027 \times 472) = 299.6$$

Under running conditions the circumference of the rear wheels of the car was 8.96 feet. The speed in miles per hour is then

$$M = \frac{8.96 \times N \times 60}{5280} = 0.1018\,N, \text{ which becomes}$$

$$M_1 = 0.1018 \times 81.7 = 8.317$$
$$M_2 = 0.1018 \times 179.7 = 18.297$$
$$M_3 = 0.1018 \times 299.6 = 30.496$$

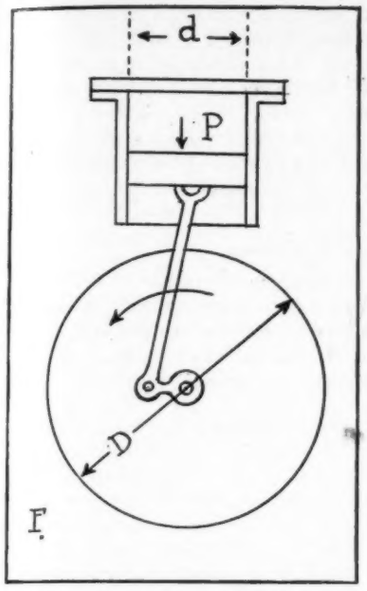


Fig. 1—Tractive power illustrated by a traction wheel directly connected to one single-acting cylinder

These are the maximum speeds that could be obtained theoretically with the respective gears and when developing the stated tractive powers.

Transmission Losses

In Fig. 2, suppose this car A to be set upon an immense hinged plan roadway B, the free end of the roadway being raised by the hyrdaulic jack C. The gears are in mesh and the car free to move. When the roadway is stationary or only slightly inclined, the car will stand still. When the free end has reached a certain elevation, the grade will become such that the car will start to run down the hill. If, immediately after the car starts, the elevation of the free end of the roadway is *slightly* decreased, the car may continue to move at a speed which will be found to vary with the amount of elevation.

The force which moves the car is the vertical component of its own weight, which may be readily compiled when we know that weight and the amount of elevation of the roadway. This force, then, may be used to measure the resistance to motion due to the internal friction of the automobile mechanism at rest or at whatever speed is desired. When once we thus know the amount of this internal friction we may reduce our values of F by these amounts so as to obtain the actual tractive force which, with the given mean effective pressure, could be exerted at the wheel rim or (more correctly) upon a spring balance restraining the car. The resistance due to friction is excessively high at starting, but this is ordinarily of little consequence.

In the experiments of Messrs. McCreery and Hidalgo the car was mounted on rollers and power was applied to the rear wheels from an electric motor. The amount of power consumed in driving the mechanism of the car at various speeds was estimated from the motor input. The results were as follows:

Gears	Speed in Miles per Hour	Horse Power Applied to Wheel Rim	Corresponding Traction Force, Lbs.
none	10.	1.18	44.31
none	18.2	2.4	49.51
none	30.8	4.05	49.38
none	40.4	5.38	50.01
none	48.8	6.81	52.40
first	4.	0.871	81.77
first	8.8	3.34	142.52
second	13.2	2.73	77.66
second	24.8	6.75	102.20
third	28.4	4.55	60.16
third	39.6	7.52	71.31

The first five results, of course, represent resistances due to the shaft and differential. The tractive forces corresponding to the measured horsepowers are thus derived:

$$HP = \text{force} \times \text{distance} = \frac{896\,FN}{33{,}000};$$

$$M = \text{miles per hour} = \frac{8.96\,N \times 60}{5280}, \quad N = \frac{5280\,M}{8.96 \times 60} = 9.82\,M;$$

$$HP = \frac{8.96\,F \times 9.82\,M}{33{,}000}, \quad F = \frac{33{,}000 \times HP}{8.96 \times 9.82\,M} = \frac{375.5\,HP}{M}$$

The deductions to be made from these figures are of considerable importance. The tractive force consumed in overcoming shaft and differential friction is practically constant showing a tendency to increase very slightly only as the speed increases. The horsepower lost in this part of the mechanism is consequently almost directly proportional to the speed. At a given speed, with gears meshed, the whole horsepower lost in the mechanism is apparently increased as the gear ratio is increased; so also, of course, does the loss of tractive force increase. Both losses increase rapidly as the speed increases, within the limits of the observations, the horsepower loss, of course, showing the more rapid increase. It must be remembered, however, that the measurements were made over trials of extremely brief duration.

Fig. 3 shows the results graphically. The economical advantage of using the high gear, from this standpoint, is obvious. Mechanical friction becomes a factor of no little importance in connection with high speeds.

Actual Pulling Power

The tests made on the car under discussion gave the following results:

Gear	Speed, Miles per Hour	Traction Force, Indicated, Lbs.	Horse Power Corresponding to Speed	Estimated Horse Power Exerted at Cylinder
3	41.4	180	27.3	19.7
3	42.8	200	30.7	22.7
3	49.2	160	29.0	21.
3	36.8	240	27.7	23.7
3	26.6	250	21.8	17.8
3	28.4	240	22.7	18.2
2	4.8	370	23.	19.
2	6.4	320	29.	22.
2	7.1	260	30.	19.5
1	2.8	740	...	....

The horsepower corresponding to the speed is, of course, $MF \div 375.5$, as already derived. The last column of the table gives the sum of this quantity and the friction horsepower, as estimated from Fig. 3. The following results may be derived from those just tabulated:

Gear	Speed, Miles per Hour	Horse Power at Cylinder	Friction Horse Power	Percentage of Horse Power Lost in Friction	Tractive Force Referred to Cylinder, Lbs.	Tractive Force to Ov'rc'me Friction, Lbs.
3	41.4	27.3	7.6	27.7	253	73
3	42.8	30.7	8.	26.1	325	75
3	49.2	29.0	8.	34.4	241.5	81.5
3	36.8	27.7	4.	14.4	308.5	68.5
3	26.6	21.8	4.	18.3	309.5	59.5
3	28.4	22.7	4.5	19.8	300.5	60.5
2	4.8	23.	4.	17.4	434.	64.
2	6.4	29.	7.	24.1	387.	67.
2	7.1	30.	10.5	35.	329.	69.

The power lost in overcoming friction is thus from 15 to 35 per cent. Of the total power developed, its proportion steadily increases with the speed and as steadily with the horsepower as could be expected with variable conditions in the cylinder. On third gear the tractive force falls off rapidly when the speed is something in excess of 40 miles per hour, or when 30 horsepower is taken out of the cylinder. A similar falling off in tractive force occurs on second gear at about 30 horsepower or a little less. As with the latter the piston speed at 30 horsepower is well below 1 000 feet per minute, it is difficult to explain the decrease in tractive force. With the third gear it is no doubt due to throttling and other vagaries of cylinder action to be expected with high piston speeds. The average tractive forces referred to the cylinder are, on third gear, 290 pounds, and

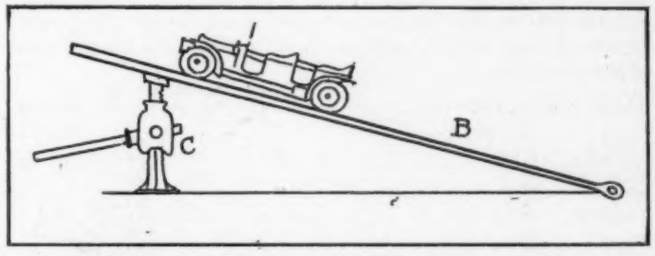


Fig. 2—Illustrating friction of machinery by the movement of an automobile on an inclined plane

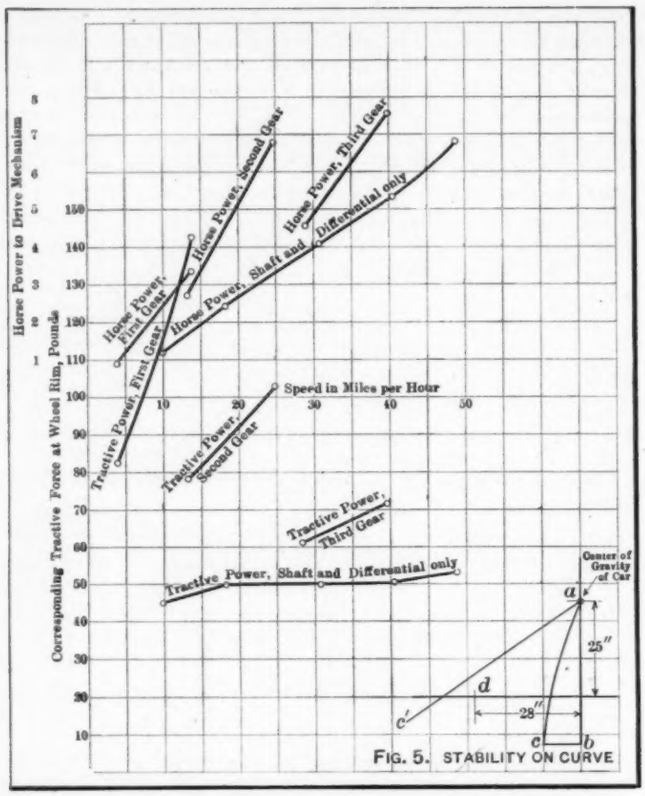


Fig. 3 (Left)—Diagram illustrating the loss of horsepower and tractive force in automobile mechanism. Fig. 5 (Right)—Showing stability on curve.

on second gear 383 pounds, or 61 and 49 per cent, respectively, of those theoretically computed for 100 pounds mean effective pressure. A bad condition at the carbureter, spark or throttle might account for these apparently low tractive forces and mean effective pressures.

Propulsion Resistances—Wind

When a body bounded by a plane surface is subjected to a normal current of air, or moves normally in still air, a pressure is produced on the plane amounting in pounds per square foot of surface to

$$0.0025\ V^2;$$

in which V is the velocity in miles per hour. The total pressure over an area of A square feet is then

$$0.0025\ AV^2.$$

In a locomotive or automobile the value of A may be taken as the sum of the areas of the approximately normal surface, since a body partially protected by a wind shield may still be subjected to some resistance as the air eddies around the latter. For the car in question we may then perhaps take A at 28 square feet, whence the resistance is

$$0.0025 \times 28 \times V^2 = 0.07\ V^2 \text{ pound.}$$

No provision is made for measuring this in testing cars by the method referred to; for, although a large fan blows air against the front of the radiator for cooling, the car does not move against this current of air nor does the presence of the latter influence the amount of power exerted by the motor. The tractive forces necessary to overcome wind resistance alone are then about as follows:

Speed in miles per hour	Resistance due to velocity in still air, pounds
10	7
20	28
30	63
40	112
50	175
60	252
70	343
80	448
100	700

If there is a head wind, the velocity of the wind must be added to that of the car to obtain the equivalent speed. Thus, a car running at 40 miles per hour against a head wind of 20 miles per hour experiences a wind resistance of 252 pounds. It appears that, as in railroad locomotives, wind resistance is of little importance at low speeds (say, below 20 miles per hour), but of serious effect at high speeds. Based on the figures given, a racing car at 70 miles per hour would experience an extra resistance of 3.06 pounds from an extra normal surface 6 inches square—say, a man's head—and this would sacrifice more than half a horsepower.

Grade Resistance

The principle of grade resistance is illustrated in Fig. 4. A is a body free to move only on the inclined plane. Its weight acts downward along the line W. This downward force may be resolved into the components N, normal to the plane, and R in line with it. The component R retards the car. Since $R : W :: Q : L$, $R = \frac{Q}{L} W$, or the resistance due to a grade is equal, in pounds, to the weight of the car multiplied by the proportion of rise in the grade: Roughly, 20 pounds per ton of car weight per 1 per cent of grade. For the car in question, which, when loaded, weighs, say, 3,800 pounds, the resistance due to grade only, on a 1 per cent. grade, is 38 pounds; on a 4 per cent. grade 152 pounds, and so on. A car must have tractive force sufficient to overcome the resistance of the steepest grade it is likely to encounter, otherwise no amount of horsepower will make it mount the hill. This is to be accomplished by using large cylinders, six cylinders rather than four, small wheels, or a high gear ratio, or by a combination of these methods; and, after all, the operating conditions at the motor will affect the tractive force more than any other factor.

Speed on Grades—Curves

The highest tractive force is developed on the first gear, and this gear must, therefore, be used on the worst grades. This means a comparatively slow speed, since at 10 or 12 miles per hour the piston speed will have reached 1,000 feet per minute. It is desirable to use second or even third gear unless the grade is such as to stall the motor, and greater economy, of course, follows the use of the higher gear. When a car is stalled on a grade, even because of a bad throttle or spark position, it may be necessary to drop to a lower gear (higher ratio) in order to start again, because the friction of a motionless machine exceeds that of one in motion (see explanation of Fig. 2).

In locomotive practice attention must be given the resistance due to pressure of wheel flanges against rail heads resulting from grades or side winds. Side winds have been known to overthrow trains on account of the large surface exposed. The side surface of a motor car rarely exceeds 35 square feet, and a wind velocity of 60 miles per hour would then give a pressure of only $0.0025 \times 35 \times 3600 = 315$ pounds. This produces no perceptible resistance to propulsion. In rounding a curve the centrifugal force, in pounds, is

$$\frac{Wv^2}{32.2\ r},$$

in which W is the weight of the car, v its velocity in feet per second, and r the radius of the curve which it is rounding, in feet. For $W = 3800$, $v = 60$, $r = 600$, this becomes

$$\frac{3800 \times 3600}{32.2 \times 600} = 707 \text{ pounds.}$$

For $v = 60$, the speed in miles per hour is $\frac{60 \times 3600}{5280} = 41.2$. At this speed, when rounding a curve of 600 feet radius, the car would develop a centrifugal force tending to push it toward the outside of the curve amounting to 707 pounds. Suppose this to be coupled with a side wind pressure in the same direction of 315 pounds, making a total side pressure of 1,022 pounds. In Fig. 5 we have the condition of stability on a road without superelevation, the center of gravity of the car being assumed to be 25 inches above the ground and the tread being 56 inches. The

vertical line a b represents the weight of the car (to any scale), c d represents the side force of 1,022 pounds to the same scale, and the straight line a c represents their resultant. If a c fell beyond d, like a c, the car would overturn. In this case it is amply stable. The centrifugal force would have to be about 4,000 pounds to overturn it. This would involve a curve of 100 feet radius at about 41 miles per hour, or a curve of 200 feet radius at 58 miles per hour. The following would be the limiting speeds on various curves with no side wind pressure:

Radius of curve, feet	Limit of speed, miles per hour
100	41.
150	50.2
200	58.
250	64.9
300	71.
400	82.
500	91.8

The possibility of reaching unsafe speeds under road racing conditions is widest. A low center of gravity or a wide tread leads to stability.

Acceleration

It is seldom that any close calculation of acceleration resistances need be made. The basic formulæ are, however, as follows:

$$F_o = 95.6\frac{V_2 - V_1}{t} + \frac{0.125}{T} \cdot \frac{V_2^2 - V_1^2}{V_2 - V_1},$$

$$F_1 = \frac{V_2^2 - V_1^2}{V_2 - V_1} \cdot \left(\frac{23.33}{s} + \frac{0.125}{T}\right),$$

in which F_o is the net constant amount of tractive force required to accelerate and overcome wind resistance in bringing a car weighing T tons from a speed V_1 to V_2 (miles per hour) in t seconds, and F_1 is the force similarly necessary to produce the same increase of velocity in the distance s feet. Additional tractive force must be provided to overcome grade and frictional resistances.

Total Tractive Power and Adhesion

In designing an automobile it is necessary to give the motor the required tractive force to meet any probable combination of resistances and to then make the horsepower such as the speed requires. For example, with a gear arrangement and weight of car such as have been described, suppose (*a*) a speed of 60 miles per hour to be required on a straight, level road, (*b*) a speed of 30 miles per hour on second gear to be demanded on a 6 per cent. grade, and let it be necessary (*c*) that the car should attain a speed of 40 miles per hour, starting from rest, in 19.65 seconds when on a level road.

For condition (*a*) the frictional resistance on third gear appears likely, from Fig. 3, to be about 90 pounds. The air resistance is

$$0.07 \times 60 \times 60 = 252 \text{ pounds,}$$

making a total resistance of $252 + 90 = 342$ pounds.

For condition (*b*) the grade resistance is

$$6 \times 3800 \div 100 = 228 \text{ pounds,}$$

the air resistance is $0.07 \times 30 \times 30 = 63$ pounds, and the frictional resistance, from Fig. 3, is 115 pounds, making a total resistance of

$$228 + 63 + 115 = 406 \text{ pounds.}$$

To meet condition (*c*) we must overcome friction corresponding to mean speed of not far from 20 miles per hour—say 55 pounds on third gear or 92 pounds on second (Fig. 3). The combined wind and acceleration resistances are, from the formula given,

$$F_o = 95.6\left(\frac{40}{19.65}\right) + \frac{0.125}{1.9} \cdot \frac{40^2}{40} = 300 \text{ pounds.}$$

The total resistance for this condition is then, with third gear, 355 pounds, and with the second gear, 302 pounds. Considering all three conditions, the machine must be capable of exerting a tractive force of 355 pounds on third gear and of 406 pounds on second gear. Taking the formula given

$$F = \frac{d^2nsP}{2ND},$$

and making $\frac{n}{N} = 5$ or 3, as the case may be, $D = 34$, $P = 100$, we have, for third gear,

$$355 = \frac{3 \times 100\, d^2s}{68} \text{ whence } d^2s = 80.3,$$

and for second gear

$$406 = \frac{5 \times 100\, d^2s}{68} \text{ whence } d^2s = 55.3.$$

We must adopt the higher value: and even this is based on $P = 100$, whereas the trials considered warrant values of P of only 61 for third gear and 49 for second. If we introduce these, the governing combination is $d^2s = 132$.

Now let us consider horsepower, using the formula $\frac{MF}{375.5}$. For condition (*a*),

$$HP = \frac{60 \times 342}{375.5} = 54.3.$$ For condition (*b*),

$$HP = \frac{406 \times 30}{375.5} = 32.5,$$ and for condition (*c*),

$$HP = \frac{355 \times 40}{375.5} = 37.6$$ on third gear and $$\frac{392 \times 40}{375.5} = 41.5$$ on second—both maximum values after the attainment of the stated speed. The conditions are not harmonious as to power; but with the extreme flexibility due to gears it is quite possible for the designer to meet any assigned grade, speed and acceleration conditions with a reasonably uniform size of cylinder as computed for each. If we take the empirical formula for horsepower, for a four-cylinder machine,

$$\frac{4d^2}{2.5}$$

our maximum condition requires that

$$d^2 = 2.5 \times 54.3 \div 4 = 33.9 \text{ and } d = 5.83 \text{ inches,}$$

whence

$$s = 132 \div 33.9 = 3.9 \text{ inches.}$$

This would give a badly proportioned motor, and the empirical formula used should be one which includes both d and s, leading to an equation in the form

$$ds = a, \text{ a constant,}$$

$$s = \frac{a}{d},$$

$$da = 132,$$

$$\left\{\begin{array}{l} d = \frac{132}{a}, \\ s = \frac{a^2}{132}, \end{array}\right\}$$

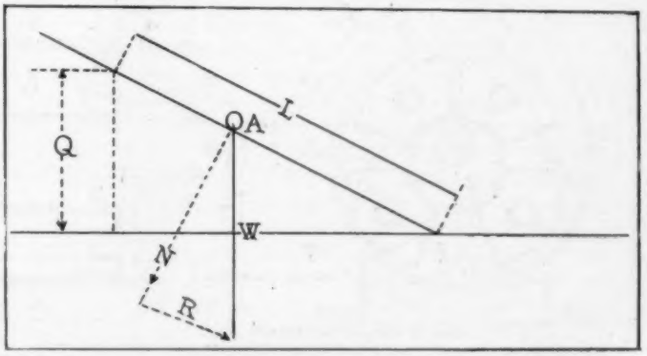


Fig. 4—Illustration of the principle of grade resistance

Novel Air Compressor

DESCRIPTION OF A NEW MECHANICAL MOVEMENT SHOWN AT THE BRITISH ENGINEERING EXHIBITION WHICH CAN BE APPLIED TO THE MOTORING FIELD

ONE of the most interesting exhibits at the Engineering Exhibition held at Olympia, says the *Commercial Motor*, London, was the air compressor shown by Lamplough & Son, Ltd. Its designer appears to have evolved an entirely new mechanical movement—one which has many practical applications in the field of commercial motoring. The same principle of construction is not limited to air compressors and exhausters, but it may be applied to pumps for oil or water, and, perhaps, we are not overestimating its probabilities if we predict that, in a modified form, it may ultimately be employed as a rotary internal-combustion engine of unique characteristics.

The design has been developed from well-known devices in which segmental pistons are employed to divide an eccentric chamber into a number of pockets whose volumes are constantly varied as the segmental pistons are driven round a circular path within the eccentric chamber. A working drawing, which shows the general arrangement of Mr. Lamplough's beautifully conceived device, is reproduced herewith (Fig. 2). This illustration shows that all the parts may be machined cheaply on a lathe; no piece, in fact, presents the slightest difficulty either in the making or the fitting stages of its production.

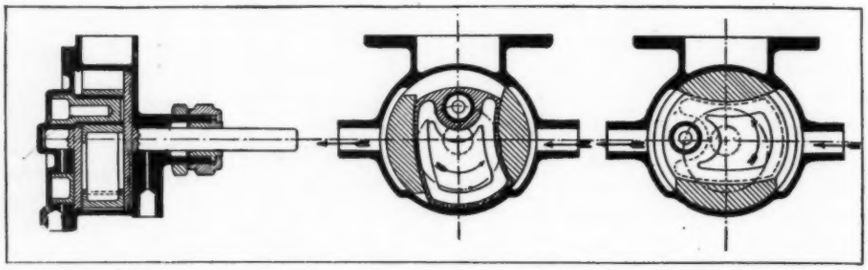


Fig. 1—Sectional views of a Lamplough double-acting positive pump

The driving shaft (A) is mounted on ball bearings in a casing which consists of two end chambers (B), which are concentric with the shaft, and an eccentrically-disposed barrel (C). Two driving discs (D) are keyed on to the shaft, and each of these has four equally-spaced counter-bored recesses in which oscillating cylinders (E) are fitted. Each of the oscillating cylinders has a crankpin (F) which engages in a journal in one end of one of the segmental pistons (G). All the oscillating cylinders, their crankpins and the segmental pistons are hollow, and, in the drawing, are shown in solid black sections. The segmental pistons may be cooled by the circulation of water or oil through them; midway of their length, they are provided with grooves (H) which permit of the passage of air or gas to or from the inlet or outlet ports and the pockets (J_1, J_2, J_3, and J_4) between adjacent pairs of pistons. The outer circumference of each segmental piston is kept up against the bored barrel (C) by means of a floating sleeve (K), while scoring of the barrel by the pistons, by reason of the centrifugal force, is prevented by the introduction of two external floating rings (L). The adjacent surfaces of the pistons and the bore of the barrel, therefore, are not in actual contact with each other, but are separated by a film of oil (the lubricating medium) which is relied upon to form a seal for the prevention or the minimization of leakage from one pocket to another.

The operation of the device is as follows: When the shaft is driven round in the direction of the arrow, it carries with it the two discs (D) and the oscillating cylinders (E); the power is thence transmitted, through the crankpins (F), to the segmental pistons (G), and these then travel round in a circle prescribed by the bore of the barrel and the outer circumference of the floating sleeve. As the path of the pistons is prescribed, so also is the path of the crankpins, but, as the latter path does not coincide with that of the centers of the cylinders (E), the cylinders are compelled to oscillate in their sockets; the effect of this oscillation is alternately to accelerate and retard the segmental pistons during their circular progress within the barrel, and the capacities of the pockets is thereby constantly varied. When used as an air pump or compressor, this alteration of the capacities of the pockets is employed, first, to draw in air through the inlet port; second, to compress the indrawn air and, finally, to discharge it through the outlet port. Reference to the transverse section will show that: the pocket J_4 is open for the admission of air; the pocket J_3 contains an imprisoned charge of air at the same pressure as that at which it was admitted; the pocket J_2 contains a fully-compressed charge about to be delivered through the outlet port; and the pocket J_1, having squeezed out one charge, is about to open again for the admission of air for a fresh cycle of operations. In this manner, there are four deliveries of compressed air per complete revolution.

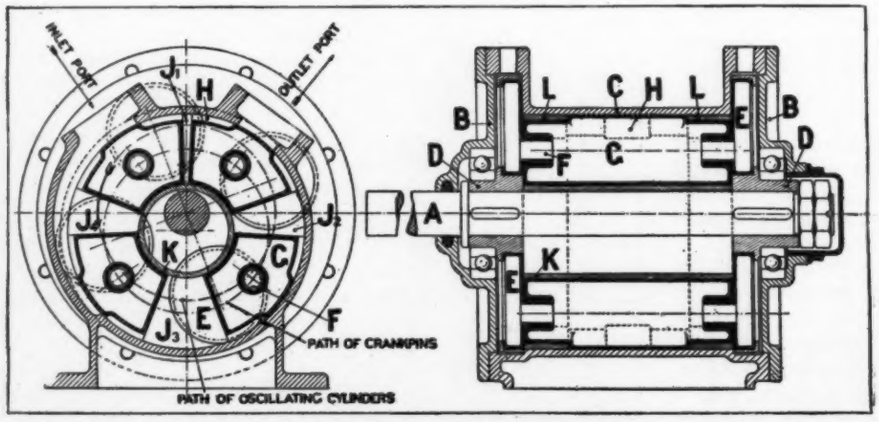


Fig. 2—A novel exhibit at British Engineering Show—the Lamplough rotary air compressor

Two photographs of one of the demonstration models which are exhibited are reproduced herewith (Fig. 3); the first shows the pocket J_1 just opening for the admission of air—the pocket J_4 has opened earlier for the escape of its charge; the other view shows that the pocket J_2 has just closed, and that the charge in the pocket J_3 has been compressed into about one-half of its original volume. It should be noted that this pump's action is positive, and that there are no valves or reciprocating parts. It is understood that one of these pumps, when used as an exhauster, reduced the pressure inside a chamber to within one inch of a complete vacuum.

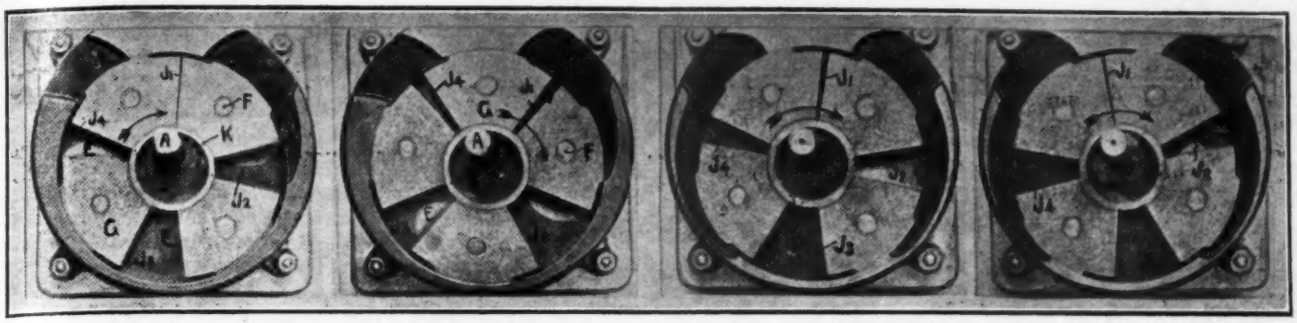


Fig. 3—First and second views show various stages in the cycle of a Lamplough air compressor. The other two views are of a blower constructed on the same principle

A model of an alternative form of blower, in which the charge is delivered against pressure but is not compressed internally, was also mounted on Lamplough's stand, and two photographs of the latter model are also reproduced herewith. A reference to those views—the third and fourth at the top of this page—will show that the inlet and outlet ports are both longer than those in the pump already described.

The latter form of construction has been employed for the purpose of forcing a charge into the cylinders on a two-cycle petrol engine, and such an engine was exhibited. Its two pistons operate on the same crank, and the charge is admitted through a port which is uncovered by the piston in No. 1 cylinder immediately after the exhaust port is uncovered by No. 2 piston. There are no valves, and the inrushing partly-compressed charge is relied upon to scavenge the previously-exploded charge. Speeds up to 3,000 r.p.m. have been obtained.

A large range of Lamplough patent double-acting positive rotary pumps for oil or water was also exhibited and sectional views of this type of pump are given on the opposite page. This pump comprises but three working parts: a curved plunger path which is cast integral with the driving spindle; a curved plunger; and a crankpin which engages in a bushed hole in the plunger and a slot in the plunger guide. The crankpin travels round the driving spindle at the same speed as the latter, but is eccentric to it; it, therefore, imparts a reciprocating motion to the plunger. Three views are given (Fig. 1): the first shows the plunger in the middle position of its stroke; in the second one, the plunger is shown just about to start sucking in water at the top and delivering from the bottom of the plunger; the remaining view is a longitudinal section through the complete pump.

One of these pumps was exhibited at the stand connected to a small cylinder into which it delivered oil against a pressure of 300 pounds per square inch.

Airships and the Navy

SOME OBSERVATIONS BY DR. ROBERT GRIMSHAW ON THE PART THAT DIRIGIBLE AIR CRAFT WILL PLAY IN FUTURE CONFLICTS ON THE OCEAN

WHEN one says "airships," the accompanying or suggested thought is immediately "military reconnoitering and attack." This is notwithstanding the fact that the airship in its various forms of motor-aeroplane, dirigible and captive balloon, etc., is destined to play eventually an important rôle in suppressing all purely military operations by making it almost impossible to fortify a country in advance in such manner that the plans for defence cannot be discovered by photography. from above on the part of investigators posing as peaceful aerial commercial voyagers or tourists—as in times of peace the air must of course be considered free to all.

The attention of the public is, however, now attracted to the fact that the dirigible airship, the motor-driven balloon and other aerial vessels have as much interest and value for the navy as for the army; although the former has evinced a seeming indifference to all that appertains to the navigation of the upper regions.

In fact, however, the admiral has just as much need of information concerning the enemy's position as has the general. The Russo-Japanese war showed the importance of obtaining and communicating such information. A balloon or other airship can pass unhindered over an obstacle, as a high mountain, photograph or sketch the position, and observe each movement of every ship of an inimical fleet, and communicate this in great detail by wireless telegraphy or telephone—even by visual signal or by the ordinary electric methods—to an attacking squadron.

But the work of aerial craft in aiding the navy is not confined to reconnaissance; they can also be used to inflict injury upon land or marine forces or defences. So in considering this topic we can divide the service into harbor and high-sea work, and each of these classes into reconnaissance and attack; under the latter being understood active defence, also.

The craft available for aerial navigation are either heavier or lighter than air, and either class may be self-propelled, towed, or merely steered; but the merely steerable non-propelled aeroplane is as yet comparatively undeveloped. Towing may be either by automobile or by a water craft.

As far as the navy is concerned, the use of aerial craft will in the first place be that of observing fortified or other harbors. These represent the entrenched or otherwise strengthened positions of the army. The aerial observer records and reports the position and character of defending forts, the number and class of war vessels stationed in the harbor, the operations of torpedo-laying forces, the path of maneuvering vessels—including sub merged submarines—and the torpedoless and mineless channels open to the attacking squadron. Where the water is clear, the position of ground mines can often be observed from an airship; and naturally that of floating mines may be mapped without difficulty, even without the aid of photography.

The general advantages of reconnaissances made from any one of the principal classes of airships are that the view is unobstructed by laterally intervening dust or smoke, to say nothing of woods, buildings and hills; and that the field of view embraces a complete circle. This is seldom or never the case where the observer is stationed upon a hill or mountain, however high. Naturally, too, the greater elevation attained the greater the field of sight. Further, there is the advantage of the overhead observer's being able not only to choose, but also to attain, the desired place of observation, and to return uninjured to the security of his own lines.

Each of the above-mentioned methods of reaching the desired station has its advantages and its partially corresponding disadvantages. In all, however, the advantages are much greater than, as a rule, the public and even the military and naval authorities have been inclined to state or even believe. This is largely because they have failed to put themselves in proper communication with those statisticians who accurately observe, record and tabulate meteorological conditions.

In reconnaissance the cellular kite towed by a motor boat is of course comparatively useless; but its value can be readily seen when one contemplates the other branches of reconnaissance, attack and defence.

The ordinary captive balloon has long ago been repeatedly tried for reconnaissance, but has as often proved unsatisfactory, on account of being so largely dependent upon the direction of the wind, which may either carry it so far over the enemy's lines as to endanger its occupants' safety, or refuse entirely to drive it in the desired direction. In addition, the height to which such mediums of observation can rise is limited.

The motor balloon or motor aeroplane would find its work in the neighborhood of the coast, in or before fortified ports. Its duties in war-time would be like those of reconnoitering parties at present. The defending party, which is supposed to be blockaded in its own port, would use it to observe, and transmit information concerning, the position, number, character and movements of the blockading fleet; further, to note and report upon the results of its own fire, with the object of correcting errors and improving or altering the aim, in case the target was moved to avoid the missiles.

On the other hand, the attacking or blockading fleet would use such overhead craft to report upon the fortifications, so long as their position had not been made known by previous aerial scouts, either during or before the war in question; or to state whether they were fully manned or gunned, and well served. If the water were clear, the actual location of ground mines could be compared with their supposed position, and any movements of submarines could be noted, with details as to ease and completeness of submergence, speed on and under water, degree of controllability, etc.

It must be understood at the outset that the towed balloon or aeroplane, whether the towing medium be an automobile or a motorboat of any kind, can be used, for observation at least, in many places where the configuration of land or water would not at first seem to render such operations possible. For while the angle at which a towed waterboat stands, and the course which it takes, as regards the towing medium, are comparatively limited, yet where there is a peninsula partially surrounding a harbor, an automobile may take charge of a captive balloon or aeroplane, and after taking such course as the configuration of the land permits, brings its "tow" to a position from which the wind will sweep it directly over the enemy's forces; and what is of equal importance, bring it back again to a convenient height from the ground by winding in, and then return with it to headquarters. Similarly, a motor boat may take a balloon or plane to a point from which it may ascend to the desired height, and then get a better view than could have been obtained from the starting-point.

The self-propelled aeroplane—and in using this term the writer does not confine himself to monoplanes, but includes the cellular kite type—would with proper motive power and good management be able to get good snapshots of the fleet attacking a harbor.

Reconnaissance by self-propelled balloon would have vast advantages over that by self-propelled planes; as the former with a very small expenditure of motive power could stay for hours or even days in the air, above the enemy's forces, moving only sufficiently to get out of danger when shots from below showed that the line of aim was getting dangerously near the right one; or by dropping ballast from time to time, remaining at a height just sufficient to keep out of shot.

Considered as attacking mediums, as for instance for dropping explosives upon the deck of an opposing fleet, or into a convenient place—say the powder magazine, in case the position of this latter should be known as the result of previous or other balloon reconnaissance or through land spies—the motor balloon or the aeroplane, whether self-propelled or towed by either automobile or boat, has at present great advantages, as up to date no modern war vessel is equipped with howitzers or other cannon capable of firing at a very high angle. The only manner of destroying a reconnoitering or attacking balloon or aeroplane would be to reach it with a sure shot from some point far enough from the threatened point to enable the attainment of the requisite elevation for the gun. This, however, would usually be at such a distance that the aim would be very much impaired.

In case of a blockade the motor airship, or with favorable wind even a captive balloon or cellular kite, would be of immense service; as the former would have facilities for convenient and repeated filling, and either would be capable of returning to its station on land—the former by its own motive power, the latter by hauling in the tow-line with a windlass, or even with an automobile.

Hauling in would also be of service in case a dirigible should adopt the precaution of taking with it a fine steel tow-line capable of being rapidly paid out and hauled in; so that if the motor of an airship were crippled there would still be a means of return to a place of safety.

The captive kite rises with increasing ease and to a greater height, with increased velocity of the propelling wind; but has the disadvantage that, should the current not be in the right direction, or should the towing vessel not be able to draw it in the general direction of the scene of observation, it cannot be used at all, as tacking—so long unknown to ocean navigators, at first thoroughly at the mercy of the winds and currents or tides—has not been successfully applied with either non-dirigble or self-propelled airships. But the towed cellular kite and its congeners are useful up to the point where the wind's velocity is over 20 meters per second, or say 45 miles an hour.* Meteorologists have, however, shown that this rate—that of a good railway train—is exceeded only about ten days in every hundred—at least in Germany.

The motor-propelled airship is independent of the wind up to that point where the latter has a velocity equal to that with which the aerial craft can propel itself where there is no wind. The airship "Zeppelin IV" traveled 15 meters a second, or say 35 miles per hour; and that fixes the point up to which it is serviceable; but there is no doubt that with improvements in motors, transmission, propellers and form of hull this speed will be greatly exceeded in the very near future. And the same statistics which aeronauts should have consulted before constructing their vessels and which the military and naval authorities should keep in mind when estimating the value of aerial craft, and expressing their opinion thereof, show that in only 12 days in a hundred is this speed of 35 miles an hour exceeded.

A motor airship designed for a long range of action, whether as accompaniment for the regular fleet, or for action on its own initiative, must be especially constructed so that it shall be entirely independent of the latter as regards supplies of food, motive fluid and material of war; although these could be carried on the airship merely as reserves for independent action, and all supplies for daily consumption and use received from the fleet convoys (or even the war vessels), so long as the airship remained in touch therewith.

The airship which takes the place of a steam pinnace must have a place therefor arranged on the deck of some war vessel, or at least of some convoy. Here comes the problem which is most difficult of safe and convenient solution—as there is already too little room on board the modern war vessel. The motive engineering department of every navy complains that when a vessel is designed the positions of armament and armor, and of coal bunkers considered as defensive armor, are deter-

* One meter per second is very nearly exactly 2.25 miles an hour.

mined beforehand by the designers; and that any space which may happen to be left over, no matter what may be its size, form or position, is graciously given up for boilers, engines and accessories. Under this state of affairs the "aerial" department would naturally be the last to be considered in the design of a new vessel; and in the case of a ship already afloat, the chance of finding proper quarters thereon for balloons and their appurtenances would be rather slim.

An advantage of airships for coast defence would be that there would always be room in or near the harbor for a large number thereof, which could be used either together for a sudden or other combined attack, or consecutively for long-continued harassing of the attacking fleet. The further advantage of numbers in this particular would be, that no one such aerial vessel would have to carry a very great weight of explosive material, or of gasoline or other propelling liquid.

There is at present no nation for which the question of aerial vessels for defence is of more importance than the United Kingdom—as once the war balloon and its congeners attain any degree of practical utility in attack, Great Britain and Ireland cease to be islands! "The wooden walls of Old England" have long ago been replaced by steel; but as against an energetic, well-commanded Continental power equipped with a good fleet of properly-manned aerial war vessels, a balloonless England would find its boasted floating and other defences, in the words of Prospero, "melted into air, into thin air."

When it comes to the matter of aerial war craft on the high seas, the problem to be solved assumes a very different aspect from that for coast attack or defence. Here the use of a self-propelled balloon or motor aeroplane is out of the question, as either of these requires to be landed from time to time for repairing, avoiding dangerous air currents, etc.; and the former for re-filling. There must be special arrangements for generating gas, and for filling captive or dirigible balloons with hydrogen, or an equivalent or substitute generated on board, as often and in such quantities as might be required; or else highly compressed gas must be stored in strong steel cylinders to be used when needed; or both methods must be available, so that either of these modes of filling the balloons could be used under normal conditions, and the other only in an emergency.

The use of captive balloons without towing calls for appliances for winding them in, which, however, would add but little to the great difficulties above enumerated. The use of special balloon-carrying ships would remedy many of the before-mentioned evils; but these would have to be well enough engined to enable them to keep on with the rest of the fleet; and while they might receive coal or other fuel from transports, they still would require to start with and maintain a considerable supply.

In all, one sees even at a hasty glance that aerial craft present interesting and difficult problems for solution, before they can render much assistance to the navy in the present set of conditions. The same could, however, have been urged of torpedoes and of submarine boats; yet no one will deny the importance of the influence which both of these have exerted upon naval warfare and construction; an influence which is increasing in variety and amount from year to year.

How to Care for the Automobile Top

A good formula for renovating a black rubber or leather top from which the enamel has largely disappeared consists of liquid asphaltum, 1-8 gallon; outside finishing varnish, 1-4 gallon; boiled linseed oil, 1-8 gallon; castor oil, 1-16 gallon; coach japan, 1-8 gallon; ivory drop black, 3-4 pound. Mix these ingredients thoroughly together in a closed vessel to permit active shaking. After agitating the contents sharply for a time, add refined or pure turpentine in a quantity sufficient to bring the mass to a good brushing consistency.

A formula including beeswax is made of asphaltum, liquid form, 1-8 gallon; outside finishing varnish, 1-8 gallon; beeswax, 1 ounce; castor oil, 1-8 gallon. Bring to an intense black by the addition of a little drop black. Mix thoroughly and thin out to a brushing consistency with turpentine.

For a straight leather top with a worn and travel-stained appearance, but sustaining no fractures in its enamel, the following mixture will serve a good turn: Neatsfoot oil, 1-4 gallon; beef suet, 3 ounces; melted beeswax, 1 tablespoonful. Melt the oil and suet together, after which add the beeswax. Confine in an air-tight vessel, agitating same until a complete mixture of the contents is secured. Apply sparingly with a soft cloth and follow up with a clean piece of woolen, wiping clean and dry.

By way of information, it may be stated that all of the above dressings should be applied thinly and worked out smooth and uniform. With the exception of the last formula, all the materials should be brushed on, using for the work a flat bristle brush of soft joint and of a No. 1 quality.

For tops other than rubber or leather the use of tepid water and castle top mixture is recommended, applied with a soft, sheep's wool sponge, wiped dry with a wash leather, and then given an application of some good transparent renovator to render the fabric soft and pliable and fortify it against the ravages of service.

In case such renovators are not at hand the mixture of oil, suet and beeswax, already referred to, wiped on with a soft fabric of some kind and dried off carefully with a clean wad of woolen, will do very nicely. This dressing and the ready prepared renovators are particularly adapted for use upon the rubber-covered cloth top finished in a dull brown effect, and known to the trade as vulcanized carriage cloth.

The lining of the automobile top should also be cared for diligently. It needs frequent brushing with a whisk broom to flick out the dust and enliven the nap of the goods. These are small matters in themselves, but they prolong the life of the top.

Bavarian Government Using Motor Postal Wagons

The Bavarian Postal Department (which, as is not generally known, is entirely distinct from the Imperial German Postal Service) has a number of motor wagons for carrying packages from the railway station to the postoffice or *vice versa*. The frames of some of these are of the Daimler 1.5-ton type, the rear wheels being driven by gears. The motor is of 28 horsepower; has four cylinders, and is arranged for either benzine or benzol. The maximum speed with load is 11 miles per hour. The "box" holds more packages than that of the usual horse-drawn wagon. There are also similar and lighter wagons of the same type, with 1-ton frames, with motors delivering 16 horsepower, with either benzine or benzol. These wagons have chain drive and can make 17 1-2 miles an hour. Both types are supplied with solid rubber tires. The carbureter has piston type throttle regulation, delivering, according to the load, the requisite amount of air. In addition to benzine and benzol, the motor can also use heavy benzine. The circulation of the cooling water is effected by a centrifugal pump; the warmed water being cooled by a bee-hive cooler, aided by a fan. Lubrication takes place automatically by means of a pump forcing oil through channels cast in the three main bearings of the crankshaft. From these points it flows through the hollow crankshaft to the piston-rod bearings. The piston is also constantly lubricated, and the oil therefrom drops on the piston wristpin. The latter is hollow, so that the oil which is not used therein is led laterally to the cylinder walls. This system of lubrication does away with oil-tubes, and lessens the probability of choking. The oil consumption is said to be about four pounds per 100 miles.

The reduction gear is connected with the motor by a friction coupling; there are four speeds forward and one backward. The gears on the hind wheels are protected from mud and dust. The driving wheels are steel castings with the tires directly pressed thereon. The differential gear is also a steel casting; but all the other parts are drop forged.

Letters

COMMUNICATIONS FROM READERS MAINLY ALONG TECHNICAL LINES—THE NECESSITY OF TORQUE RODS; STEEL BALL IN CYLINDER TO PULVERIZE CARBON DEPOSITS; THE TESTING OF TIMERS, ETC.

Are Torque Rods Necessary?

Editor THE AUTOMOBILE:

[2,374]—I have an automobile of foreign manufacture and have constant trouble with the gear-box bearings and the universal joint behind the gear box. There are no radii or torque rods fitted to the car. Could you suggest a method of overcoming the default. F. E. D.

Larchmont, N. Y.

The fact that your car is not fitted with torque rods is sufficient to cause the trouble you experience. We should suggest your studying the accompanying diagrams and fitting rods that seems best adapted to your particular car.

Fig. 1 shows a back axle without any torque rods at all. The action of starting, stopping and going over inequalities of roads tends to push the axle forward, throwing all the strain on the pins of the spring shackles. If a rod were fitted to each side of the frame and attached at the rear end to clips on the rear axle this push or torque would be absorbed therein instead of in the pins. An easy method of fitting torque rods to cars that are manufactured without them is shown in Fig. 2 (the two top rods, however, are not absolutely necessary).

A method favored by quite a few manufacturers is shown in Fig. 3 here, it will be seen that the axle is held in tension forward near the gear box by tie-rods made from steel tubes; the axle in this case is allowed a small amount of movement backward and forward, but all harshness of shock is taken up in the springs above and below the rod. Another method of attachment of the torque rod to the frame is shown in Fig. 4. The same effect is obtained as in Fig. 3, the difference being that the attachment is held perpendicularly rigid with the frame instead of oscillating.

A substantial method of attachment is shown in Fig. 5; this type can easily be fitted to a car that is without rods. If necessary an extra cross member to the frame can be fitted to accommodate the front bracket.

Some cars use three rods to take the torque and thrust. Two rods are fitted from the axle casing to gusset plates hung from the frame at points in line with the universal joint behind the gear box, as shown in Fig. 6. A third tie-rod is attached preferably on the top of the axle casing to a point equidistant to the bottom rods. This will form a parallelogram of the rear construction suspension, allowing the bevel wheels to work always in the same plane, while with the other types shown the plane of the working of the axle in relation to the drive constantly alters.

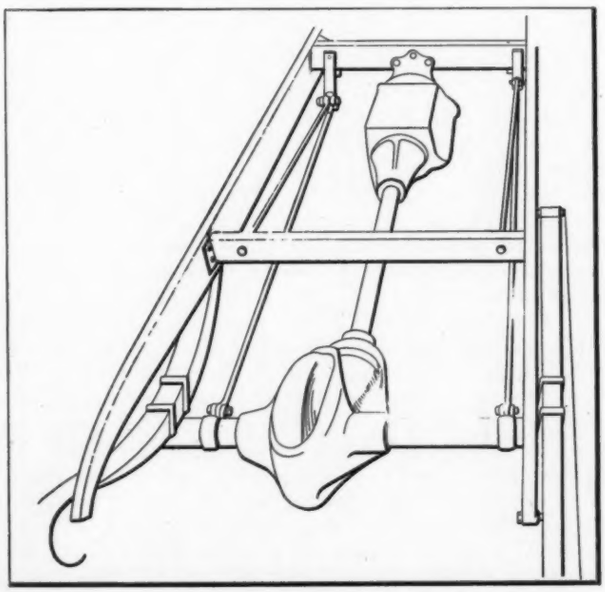


Fig. 2—Simple torque rods that can be fitted to cars that are built without any

A Sparrow Is Not Shocked When on Telegraph Wire

Editor THE AUTOMOBILE:

[2,375]—Please answer in the next issue of your paper why a person will not receive a shock when placing the hand on an engine after the current has passed through a spark plug?

2. Of what use is the compression chamber in a spark plug?

3. About what is the average difference in piston displacement to compression chamber in gasoline engines? L. S. TUTTLE.

Eastport, L. I.

(1) The reason why a sparrow is not shocked when he perches upon a telegraph wire is because our feathery friend does not help to complete the circuit. Were the sparrow to put one foot upon the telegraph wire and the other upon the ground he would then be in shunt relation and would be shocked. The same is true of man and his relation to the spark plug. He must become a part of the circuit either in series or in shunt ere it will be possible for him to realize that the electromotive force delivered from a high-tension coil is sufficient to make him take notice.

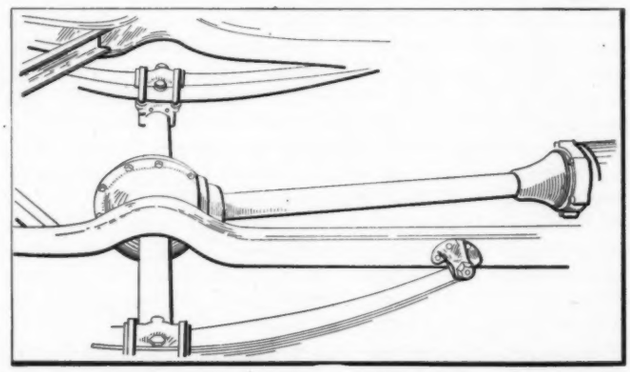


Fig. 1—Torque taken up in spring shackles and on tubular covering of driving shaft

(2) The compression chamber in a spark plug is the residence of pure mixture, and the same being pure it is ignited more readily, and the ignited mass shoots out of the chamber into the body of mixture in the combustion chamber, thus affording a wide distribution of flame, which, of course, adds materially to the value of the spark.

(3) This question is not sufficiently clear to permit one to say anything. The clearance space in the average motor is not far from 23 per cent. In racing types of motors it is higher; in "soft" motors it is somewhat lower. Perhaps you refer to the clearance space.

Suggests a Steel Ball to Pulverize the Carbon

Editor THE AUTOMOBILE:

[2,376]—Some time ago I wrote an article for your columns suggesting a steel ball in the combustion chamber as a remedy for

carbon deposits. A little later you wrote me that two parties had condemned the idea after using it. The idea was taken up in England, and if you care to look at the *Motor Car*, of London, of March 26 last, you will see what they have to say, and this is followed by a letter from a prominent user of an English car in the issue of the same journal of May 7 giving extended experience with the idea. I have also given the plan a severe trial and am sure that the steel ball, if not too small, will not get wedged in and injure the walls of the cylinder at all. It does the work and does no harm. I enclose you a recent letter from a party who has used it, but he did not know that by running the motor with one spark plug out for a minute he can blow out the ball easily. A. D. HARD, M. D.

Marshall, Minn.

The idea suggested has for its basis the use of a steel ball such as is ordinarily employed in ball-bearing work. The spark plug is taken out of one of the cylinders, and the steel ball is dropped in so that when the motor is standing still the ball rests on the head of the piston. When the motor is started and run, through the good office of the remaining cylinders, the ball is bounced around, bombarding the surfaces, with the result that carbon deposit is reduced to powder. After the process is conducted in this way the carbon powder is blown out through the spark plug hole, and if the motor is of the type that will permit of fishing the ball out the process may then be considered completed.

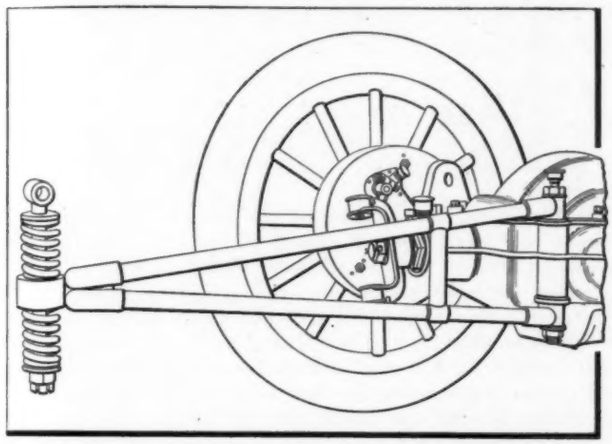


Fig. 3—The most usual type of torque rod used on early types of French cars

Wants to Know Why Timers Are Not Better Tested

Editor THE AUTOMOBILE:

[2,377]—My experience, which extends over three or four years, confined, to be sure, to substantially the two models of cars that I have owned and maintained, leads me to believe that the makers busy themselves with the more important matters to the detriment of the details. I am willing to concede that in the early days of automobile building there were so many kinds of trouble that it was necessary for the men who did the work to work on a basis of first come first served, and this applied to the troubles that arose as well as to the every-day matters. But the time should soon be here when the little things be given the attention they deserve. I would suggest that the wiring be better done, and that the battery installation be afforded a little discriminating care. Then, there is the timer. I have had a good deal of trouble with timers. Were the makers to test these little pests they would probably find that some of them are scarcely worth attaching to good motors. READER.

Philadelphia, Pa.

This particular autoist has probably been so busy with his own trouble that he had very little opportunity for individual research beyond the limit of his own relatively restricted zone, nor did he go about among the makers sufficiently to find out just what they are doing. A visit to the various plants will probably show that the makers who expect to survive are testing out pretty much everything from raw material to accessories and with sufficient care to enable them to decide with some certainty as to the expediency of employing the materials and accessories that will come nearest to serving their purpose. It would be impossible to take sufficient space here to furnish all the evidence of activity that is available, but the following test of a timer as made in the Thomas laboratory at Buffalo will suffice to cover the point to be made:

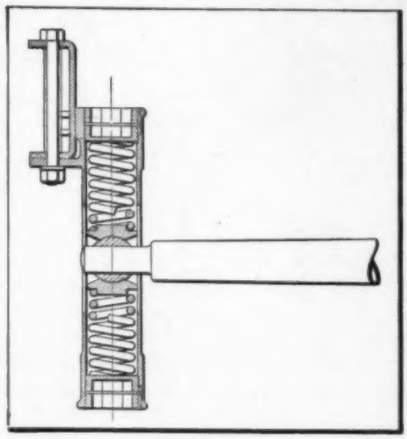


Fig. 4—Ball thrust at end of torque rod

This timer consists of both a primary timer and a high-tension distributor. The timer proper consists of a beveled wheel running in a V-groove cut in six hardened steel contacts, equally spaced in a fiber ring. The space between the contacts is touched only by the very edge of the beveled wheel. The wheel is held in contact by a lever or spring. The high-tension distributor is insulated from the timer by a fiber plate, and consists of a small ball mounted at the end of a light helical spring. The casing is of black fiber and equally spaced are six tool steel pieces flush with the bore of the fibers.

The small ball sweeps over each in turn, thus distributing the high-tension current to the proper plug. The shaft of the timer is mounted in two small ball-bearings. The advantage claimed by this timer is the large contact surface and long life.

The form of the wheel and bevel groove (both having the same angle) causes a certain relative slip, which is supposed to keep surfaces clean. The fact that the edge of the wheel only is in external contact with the case is supposed to prevent the picking up of dust and oil and depositing them on the contacts.

The timer was driven in a horizontal position by means of a small shaft journaled in two brass bushings. Two small universals connected the shaft to the 5-horsepower motor. The timer mounting was very rigid, and lined up so as to keep down vibration. The continuous counter on the ball-bearing testing machine was used to record the number of revolutions of the timer.

A Connecticut single-unit coil and six spark plugs were wired up as used in practice. Gould six-volt storage battery formed source of ignition.

Electric motor speed, 1,250 revolutions per minute, corresponding to 2,500 revolutions per minute on motor.

Reading on ball-bearing testing machine at end.....	2,936,000
Reading on ball-bearing testing machine at start.....	1,500,000
	1,436,000

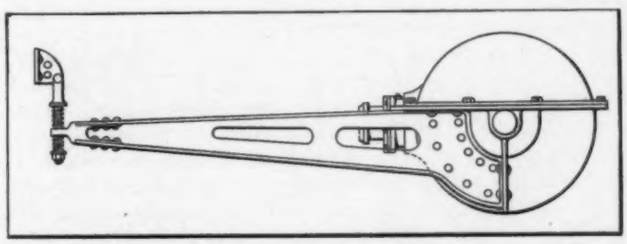


Fig. 5—Steel plate used instead of tube where a cross member of the frame prevents using a triangular type, as in Fig. 3

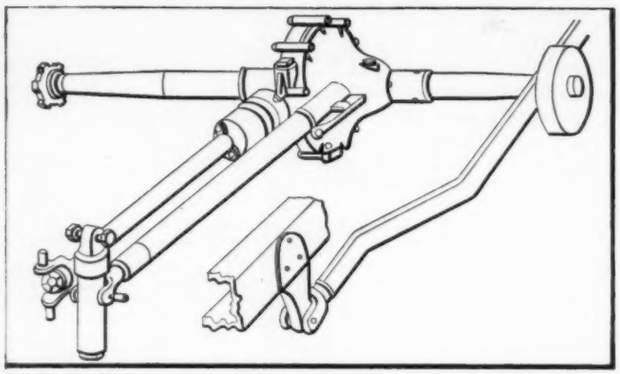


Fig. 6—Parallelogram formed by the three rods preventing any forward thrust

Ratio of speeds of motor and ball-bearing shaft practically 1 to 2.

Total revolutions per minute of timer = 718,000.

At 2,936,000 the lever holding the wedge-shaped wheel against the contacts broke and test was stopped. During running it was found next to impossible to get good, even sparking at speed of 1,250 revolutions per minute. Several different coils were used, but all with the same result. As speed decreased when circuit of motor was broken the contact would greatly improve. The timer cover was removed while the timer was being driven at 1,250, and a perfect shower of sparks was noticed; also bad arcing. The timer wabbled very badly and had considerable drag.

Upon examination the primary contacts were found to be worn badly in spots where it seemed as if the wheel had continually jumped and clattered. The high-tension ball and contacts were pitted, but not seriously.

The timer was lubricated well, but the results do not show it up as well as could be desired.

Wants Information of a Varied Character

Editor THE AUTOMOBILE:

[2,378]—I shall esteem it a favor if you will answer me the following questions through the columns of your paper:

1. What is good to remove tarnish on brass?

2. Is 31 teeth in the rear sprocket and 8 teeth in front sprocket the best gear ratio on an auto that has a two-cylinder opposed 4 1-2 inch x 4 1-2 inch, 12 horsepower engine fitted lengthwise in the machine and 28-inch wheels?

3. Is an automatic compression feed good to feed oil in crankshaft bearings to keep plenty of oil to splash, or is constant level either fed by a tank, the tank being airtight and oil flowing to a certain level in the crankcase from tank only as fast as needed.

4. Do you think that a radiator that has 28 tubes 5-8-inch diameter and 19 inches long, together with a three-gallon tank, will cool a two-cylinder engine 4 1-4 x 4 1-2; has a gear pump run by chain from crankshaft?

INQUIRER.

Galva, Ill.

(1) See page 536, this issue.

(2) The ratio of 8:31 should answer very well on your car for give-and-take roads, but there should be at least 13 teeth in the pinion.

(3) We do not understand what you mean by automatic compression feed lubrication. Whatever method you employ to keep a constant level in the base chamber should answer.

Feeding the base chamber through the bearings is better than direct to the crankcase. If the tank you use is airtight you must use pressure either furnished by hand or by the engine with a relief valve. If, however, you desire to use a gravity drip feed system you must have a vent in the top of the tank to allow the air in, otherwise the oil will not flow.

(4) Provided your radiator is in a position that the rush of air can strike it and the speed of the pump is fast enough, the amount of water and size of piping should give good results.

Questions That Arise

CONCERNING THE EFFECT OF HIGH VOLTAGE BATTERIES ON HORSEPOWER; PROPER METHOD OF OILING; SOME REASONS WHY METAL CLUTCHES SLIP, AND THE REMEDIES

[233]—Does the use of higher voltage batteries increase the horsepower of a gasoline motor?

This query can best be answered by publishing the following analysis of a test in which the engine used was a 40-horsepower, six-cylinder Napier, fitted with the maker's standard synchronized battery and coil ignition, the battery showing 4.8 volts. The engine was started up and allowed to run for some time so that an even temperature might be obtained.

The engine was first run and the horsepower taken for a period of two minutes, the average output shown being 40.9 horsepower for the period. A special coil was then installed, but the same accumulator used. The engine then gave 42.5 brake horsepower. The same coil was again employed, but the voltage was increased to six, and the conditions were otherwise unaltered. The power fell to 42 brake horsepower.

The same coil was again used with six volts, but the trembler blade was adjusted lighter than before. The same brake horsepower was registered. The trembler blade was then adjusted a little more heavily, and 8 volts used. The result showed 42.6 brake horsepower. The voltage was increased to 10 volts, the adjustment of the trembler blade remaining the same. The brake horsepower fell to 42.

The voltage was then reduced to 4, but the trembler blade was unadjusted. The brake horsepower rose to 42.2. The trembler blade was then adjusted a little more lightly and four volts used. The brake horsepower fell again to 42. The standard

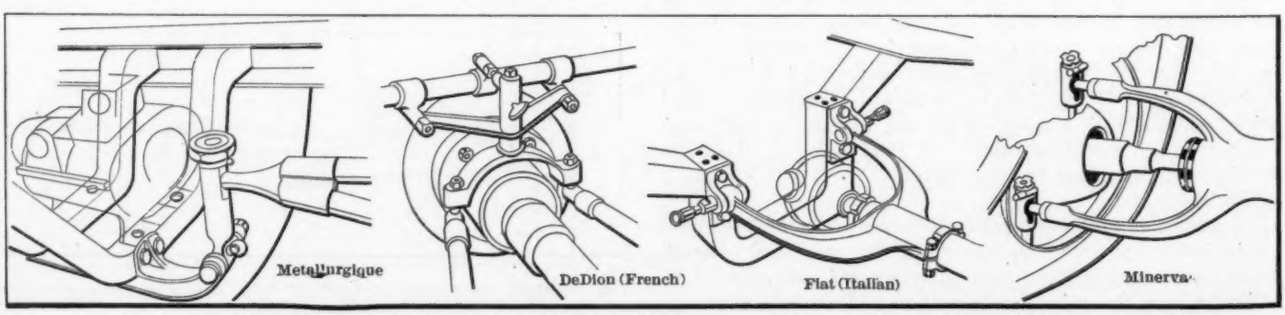


Fig. 7—Showing various foreign methods of attachment of torque rods, all intended to accomplish the same result

coil was replaced and an accumulator showing 4.2 volts fixed up. The brake horsepower registered was 42. The idea in going back to the standard coil with small voltage and special coil with small voltage again was to see whether any alteration had taken place in the engine itself. As the result showed, the brake horsepower still remained approximately 42.

The sum of the tests showed that the horsepower varied slightly from 42 brake horsepower, irrespective of the voltage rate, or whether the trembler blade was adjusted lightly or heavily. A main point, however, noticed was that at the lower voltage the engine ran with the spark very much advanced; in other words, for a given engine speed it commenced to knock with a less advance when using a higher voltage sooner than with the lower voltage.

This phenomenon suggests that nothing is gained by having a fiercer spark than that obtained from a fully charged battery showing 4 volts and means of varying the timing.

[234]—How much oil does a magneto require?

The accompanying sketch shows clearly the absurdity of pouring oil *on* oil holes instead of pressing the spout of the can into the hole and giving a drop or two. Besides, pouring oil all around the mouth of the orifice has the effect of coating the surrounding parts, so that they catch particles of dirt and dust which will eventually find their way into the bearing. Particular care should be taken in oiling such engine parts as valve rockers, pins and guides.

[235]—What is the customary rating of tires for various degrees of inflation?

The following tabulation is a near approach to average conditions:

INFLATION PRESSURE TABLE PER TIRE

Size Tire	Pound Load									
	200	300	400	500	600	700	800	900	1000	1100
	Pound Pressure Inflation									
3 inch	45	55	65							
3 1-2 "		50	60	70	80					
4 "				65	75	85	95	105		
4 1-2 "					70	80	90	100	110	
5 "						75	85	95	105	115

The following table has been compiled by a well-known tire concern and represents about average practice:

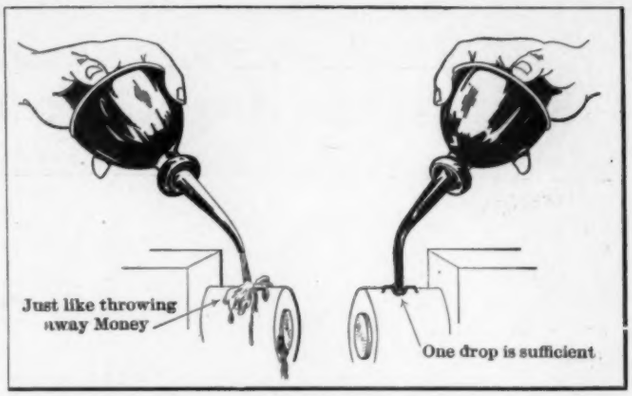
Size Tire	Front Lbs. Pressure	Rear Lbs. Pressure
3 inch	70	70
3 1-2 "	60	70
4 "	70	80
4 1-2 "	80	90
5 "	100	110
6 "	120	130

[236]—What are the different causes of metal clutches slipping?

(1) Incorrect lubrication causes slipping, or abrupt engagement. To remedy this, empty the clutch of all lubricant and fill with one pint of kerosene, screw up vent plug, start engine and run for two or three minutes, letting the clutch in and out several times so that the kerosene can clean the interior faces of the plates. Thoroughly empty and wash out with a small quantity of gasoline. An excellent lubricant that will be found to give good results is a mixture of two-thirds medium engine oil and kerosene. To mix these together take a vessel and pour the oil in first and the kerosene afterwards and with the use of a syringe work the two together for a minute or so before injecting.

(2) Plates worn too shiny and thin. Replace the very thin ones by new ones and rough the others up slightly with emery paper. The cause of a new plate clutch being harsh is that the surface of the plates is too rough; this should soon wear off. Wear on the plates sometimes allows the inside nuts to bottom against the case, completely counteracting the action of the spring; filling the heads of the nuts will sometimes remedy this temporarily, but as soon as new plates can be obtained they should be inserted.

(3) Deposit of metal particles secreted between the plates, preventing proper adhesion. Remedy same as No. 1.



There is a wrong way and a right way of oiling—both are here shown

(4) After an adjustment the pedal arm touches against the groove in the floor boards, preventing the clutch from getting its full thrust.

(5) Some makers do not put a universal joint between the clutch and the gear box; the whip in the frame going over bad roads has a tendency to make the clutch slip. The same applies if the alignment of the above-mentioned organs is not correct. A universal joint between them will remedy this.

(6) The thrust bearing on the clutch fork should be kept well lubricated, otherwise the operation of the clutch will be uneven. Unless this operation is effected automatically it should be attended to at least once every 100 miles, and oftener for traffic driving.

[237]—Is loss of compression ever caused by rotary motion of piston rings?

After an engine has been run for some time it may be found that it loses compression and one naturally looks to the valves for the trouble. After all the carbon has been removed from these and they have been carefully ground in, there is still a falling off in power. Providing the gasket-joints are right the cause of the trouble can be expected to lay in the piston rings. Upon dismantling the cylinders the pistons and rings will be found to be scored in places, which indicates that the compression has been leaking past the rings. The only remedy for this trouble is new rings. Great care should be taken to make these a good fit in the slots and the utmost distance between the ends when compressed should not exceed 1-64-inch. It has been found that this does not always stop the leakage. It is thought that the force of the explosion gives a slight rotary action to the rings so that the slots come into a line, allowing the gases to escape.

If the slots are cut step-fashion no amount of rotary action will affect the loss of compression through the position of the rings, provided these fit well in their grooves and join well together.

As piston rings are made from hard cast-iron, great care should be exercised taking them off and replacing them. To insert the piston into the cylinder it is necessary to compress the rings by hand and unless the cylinder is lowered slowly one is liable to pinch the fingers between the knife-like edge of the ring and the cylinder base.

[238]—What is the correct way to stand to start a car?

Stand perfectly square, facing the radiator; to accustom yourself to this position take the left side of the frame in the left hand, the starting handle in the right; pull *up* smartly if coil is used; when the handle is at the topmost point pull it towards you so that it disengages from the jaws or pin on the engine. Be sure that the elbow is kept well out when swinging the handle for starting on the magneto; if not a backfire may force the arm between the upcoming handle and the side member of the frame, causing either a broken or dislocated thumb, wrist or elbow. Practice this position with the current off several times after watching an experienced man start the car.

Keeping the Bright Work Up

M. C. HILLICK TELLS HOW TO KEEP THE METAL PARTS OF A CAR UP TO STANDARD; GIVES OTHER ADVICE

TO maintain the brass and nickel furnishings of the automobile in a bright, clean condition constitutes no small share of the caretaking of the car. There are plenty of simple formulas and ways for brightening up the brass fixtures, but some are more or less ineffective and others are harmful to the metal, especially after the lacquer becomes worn away. Following are some good and effective ones: To remove dirt, tarnish and corrosive accumulations from the metal parts while the lacquer remains in a good state of preservation use a mixture of 5 parts of whiting and 3 parts mutton tallow. Another formula consists of dissolving 8 parts refined soap in 10 parts of warm water, after which add 30 parts of whiting.

Again, add to every 2 parts of sulphuric acid 1 part pulverized bichromate of potash. Mix the two ingredients thoroughly and dilute with water equal in weight to the acid and potash. To use this polish wet over the brass with it, wash at once in clean water and wipe dry immediately, then giving the brass a light polish with rotten stone under a piece of chamois skin.

Another formula is made up with 60 parts carbonate of magnesia and 1 part ferric oxide, mixing well together. Moisten a soft woolen cloth with denatured alcohol, dip in the powder, rub the metal smartly and dry off with a soft leather or clean woolen cloth.

In case the brass or metal is to be refinished it will first be necessary to remove the old lacquer completely, which may be accomplished as follows: Mix 4 parts denatured alcohol with 1 part ammonia. Dip a woolen cloth in this fluid and then dip the cloth in tripoli, rubbing hard and firm. After removal of the lacquer, polish and clean with a mixture consisting of 4 parts of refined soap and 3 parts rotten stone. Dissolve the soap to a thick glue consistency, stir in the rotten stone and then reduce to a heavy liquid consistency with turpentine.

Another formula for this work is made up by mixing 5 parts pulverized chalk and 4 parts tripoli powder mixed to a rather stiff paste in melted beef and mutton tallow, equal parts.

For large garage or paint shop work where a considerable amount of brass and other metal parts are to be cleaned it will be necessary to provide for handling the work with greater expedition. To accomplish this, arrange two tanks of wood, copper lined, with a coil of steam pipe in each and each tank of 60 gallons capacity. Into tank No. 1 pour 50 gallons of water, to which add 6 pounds of lye or caustic soda.

In tank No. 2 pour a like quantity of water, to which add 1 1-2 pounds oxalic acid. Before placing the brass in the lye or caustic soda solution turn the steam into the pipe long enough to heat the water close to the boiling point. Let the brass parts remain in tank No. 1 sufficiently long to remove the lacquer, whereupon proceed to transfer the brass to tank No. 2, into which the steam has previously been turned until the solution is very hot. This solution after a short immersion will serve to remove the tarnish from the brass and to neutralize the effect of the lye or caustic soda. Upon removal of the brass from tank No. 2 it should be at once wiped dry with clean woolen cloths and either polished to a high luster with some one of the polishing preparations named above or put upon a buffing wheel and buffed to a high polished condition. In lieu of the lye or caustic soda solution a dip may be provided by mixing 2 parts of sulphuric acid with 1 part nitric acid by volume or liquid measure. A tank lined with heavy sheets of lead will be necessary to hold this acid mixture in confinement. A room specially equipped and set apart for this work will be found essential in order to dispose of the brass and metal equipment on a large scale.

As soon as the brass is polished or buffed, as the case may be, it should be dusted off carefully and in a clean warm room coated with lacquer made and sold expressly for this purpose. If this lacquer is not at hand a substitute lacquer may be provided by letting down white shellac to a very thin state with denatured alcohol. A thin crystal white varnish also makes a very good substitute in emergency cases.

Statuary Bronze Finish for Brass

In connection with the above it appears that a considerable following of automobile owners and users is taken up with the statuary bronze finish for brass parts. This style of brass finish has proved exceedingly popular with railway companies and their patrons throughout the country and the manufacturer of automobiles and automobile accessories may even incline to its use. To work out the statuary bronze on smooth highly polished brass prepare a No. 1 solution consisting of 1-2 ounce of liver of sulphur, or, in the language of the chemist, sulphuret of potassium, added to 1 gallon of water. Maintain this solution in a hot state by confining in an earthen crock set into a vat of hot water to within a couple of inches of the top of the crock.

Solution No. 2 is made of 1-8 gallon sulphuric acid and 10 gallons of water, cold. First, clean the brass parts in a potash solution. Then rinse in clean cold water, from which bath it is transferred to the No. 1 solution and then on to the No. 2 solution. In case of yellow brass this dipping first in solution No. 1 and then in solution No. 2 will have to be repeated several times or at least often enough to develop the desired bronze effect.

A sand blast operated by a compressed air or a stiff wire wheel brush should be operated, upon which the oxidized brass may be used to bring out the color uniformly over all the surface of the brass. In the case of yellow brass, of smooth finish, after giving it an acid dip it should be put on the wire wheel brush to give it the desired mat. Yellow brass having less copper in its composition than the brighter, lighter brass, is acted upon slower than the latter and it therefore oxidizes slowly. Dip in No. 1 solution, then at once in No. 2 solution, then rinsed, first, in cold and, second, in hot water and finally dried in sawdust. Next it is worked upon the scratch brush, after which it is for a second time put through the entire operation, thus furnishing an attractive bronze finish.

In brass finish there are apparently different compositions of metal such as, for example, high yellow brass, old brass, red brass and so on. To overcome the disadvantages incident to working out a uniform color and finish on these various styles of brass many railway companies copper plate all the brass parts, thus giving them a uniform color to oxidize upon. The brass parts having a dead finish need only to be acid dipped to make them conform to the color of the remaining brass and give them the statuary bronze finish.

A single immersion in the No. 1 and No. 2 solution will suffice, as a rule, to give red brass or any brass or other metal low in its proportion of zinc its proper degree of oxidized effect.

With either kind of brass when the fixtures are taken from the No. 1 solution they should be taken on through the No. 2 solution, this latter being necessary to bring out the desired oxidized bronze effect.

This exceedingly popular green effect is developed by using, for work to be handled on a large scale, 30 gallons of water, 3-8 gallon stale beer, 1-8 gallon acetic acid, 1 1-3 quarts vinegar, 4 1-2 pounds rock salt, 9 1-2 pounds sulphate of copper and 2 1-2 pounds sal ammoniac. Dissolve these ingredients com-

pletely and mix thoroughly, using in a cold state. Clean carefully the copper or brass surface, then immerse in the solution for 10 or 15 minutes or long enough, in fact, for the dark corrosion to show itself. Then remove from the dip and with a stiff bristle brush proceed to stipple the surface by tapping softly with the point of the brush not only to produce the mottled green effect, but to prevent the runs which might otherwise show in the finish. Avoid using the green too strong. The proper surface condition should be a dark field with the beautiful green showing through in the form of a mottled effect.

After dipping and stippling the brass should be exposed to the air for, say, half an hour, during which time the wonderfully soft, lustrous green will come forth.

Permit the surface after this treatment to dry thoroughly, at the expiration of which time apply a very thin coat of lacquer or some practically transparent substitute for lacquer. This thin protective coating serves the double and indispensable purpose of protecting the finish from change at the same time yielding the greenish yellow shade, which, on the dark ground work, is esteemed the truly fashionable and quite the most correct and best antique.

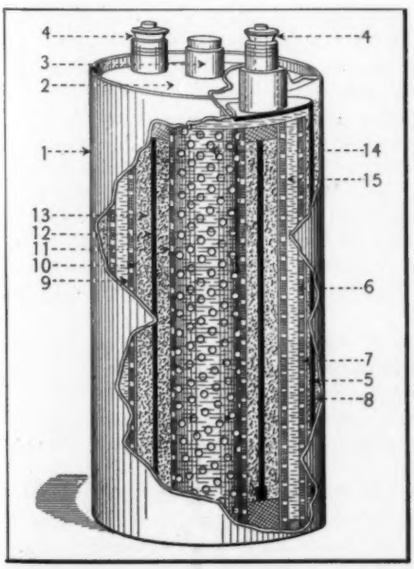
By way of a concluding word, it may be said that these formulas will necessarily have to be worked out with the explicit understanding that materials do not always act the same, being very sensitive to prevailing conditions and to methods of handling.

Digest

BRIEF RESUME FROM FIFTY FOREIGN JOURNALS—NEW FRENCH STORAGE BATTERY GIVING INCREASED LIFE AND CONSTANT CAPACITY—"CONGRESS OF THE CHILL" IN VIENNA—DIRECTIONS FOR QUICKLY DETECTING VANADIUM IN STEEL

Each element of a new French electric storage battery, called the Phoenix, weighs 4.545 kilograms and a vehicle battery composed of 44 cells in a rectangular tray weighs 200 kilograms, plus the weight of the tray, which varies according to the requirements. According to trials the useful capacity of a battery of this size reaches 36 watt-hours per kilogram of total weight, or 7,200 watt-hours for the battery. An estimate of the cost of operating and maintaining a taxicab equipped with this battery is based on 120 kilometers of travel for each charge and is placed at 18.40 francs per day, as compared with a cost of 28.43 francs for operating a gasoline cab the same distance each day, under conditions of city traffic. The component parts of a cell are enumerated as follows:

(1) A cylindrical casing usually made of ebonite of special quality and somewhat elastic, marked 1 in the accompanying illustration. (2) A conductive grid 5, made of lead or a non-corrosive alloy and formed of a lower ring provided with thin bars of the same metal extending vertically upon the circumference of another ring which serves for support. (3) A cylindrical vessel of ebonite, perforated with holes 6. This vessel is covered exteriorly with a layer 7 of cellulose capable of absorbing liquids and offering only small electric resistance while preventing active matter from penetrating to the vessel. Between this perforated vessel and the exterior layer there is a cylindrical space in which the conductive grid 5 is placed. (4) A second conductive grid 12 similar to the first one and placed in the interior of a second perforated vessel. (5) The second perforated vessel 9, similar to the first one, but of course of smaller diameter so as to leave a free circular space where the second conductive grid is lodged. Like the first perforated vessel it is covered with a layer of cellulose permeable to liquids.



An element of a new French lead storage battery

The space between the casing and the first perforated vessel and containing the first conductive grid is filled with the positive active matter 8. The negative active matter 13 is placed in the annular space containing the second conductive grid; that is, between the two interior vessels 9 and 11. The electrolyte occupies the free spaces 14 and 15. The upper ends of these two annular spaces containing active matter are closed by means of a rubber ring, while a cover 2 made of insulating material closes the upper opening of the enclosing layer of cellulose and is formed with a central aperture closed with a rubber stopper which is removed during charging to release the gases developed, and the electrolyte is introduced through the same aperture. Each of the two conductive grids carries a stem which passes through the cover of the cell, constituting the positive and negative electrodes 4. The construction is believed to obviate all dropping of active matter to the bottom of the cell, and resulting short-circuiting, and also all buckling of grids by simpler means than are employed for the same purposes in the ordinary lead-lead batteries, the reasons for this belief being given in the article. In the ordinary battery the dead weight caused by materials which serve only the purpose of safeguarding its functioning reaches a figure which reduces the capacity of the battery as a whole to 7 1-2 ampere-hours for each kilogram of battery weight, while in the Phoenix, invented by a Mr. Genard, the active matter constitutes 42 per cent. of the whole weight, and the capacity is thereby raised to 14 ampere hours per kilogram. At the same time the active matter in Genard's battery contains only pure and dry oxides of lead, while in other batteries admixtures of glycerine, magnesium or asbestos are resorted to for purposes of strength.—*La Vie Automobile,* Aug. 27.

The second "International Congress of the Chill," as it is picturesquely called, being a congress for the consideration and advancement of methods for chilling or cooling, will be held in Vienna, October 6 to 11 next under the patronage of Archduke Leopold Salvator. The first was held in Paris in 1908. Hence the name *Congrès International du Froid.* The subjects for discussion are divided as follows: (1) the science of cooling; (2) industrial production of coldness; (3) chilling in alimentation; (4) chilling in other industries; (5) chilling for transportation purposes; (6) administrative and legislation. A program for discussion, aside from the ordinary grist of papers and memoirs, has been worked out by the *Société Internationale du Froid,* whose address is 10 rue Denis Poisson, Paris, and the subjects will relate largely to processes of cooling not widely understood or known, it being the object of the society to stave off lengthy academic discourses. Chilling methods used in the chemical industry, which were neglected at the first congress, will be treated fully in the regular papers.—*Le Génie Civil,* Sept. 3.

For cheap aluminum castings a 33 per cent. zinc alloy with fusion point about 470 degrees centigrade is preferable, but for castings which must be particularly light and are subject to considerable deformation stresses an alloy with copper, though much more difficult to cast, meets the requirements better. There must first be made an alloy of 50 per cent. copper and 50 per cent. aluminum, which requires high heat and causes the formation of oxides and ashes. Commercially pure aluminum is added afterward, until the copper content is reduced to about 7 per cent., and the alloy has then a fusion point between 560 degrees and 622 degrees centigrade.—J. L. Jones quoted in *Chemiker Zeitung*, June 21.

A rapid chemical method for ascertaining the presence of vanadium in steel is described by Paul Slawik. It is based on the fact that a brownish-red coloration is displayed when vanadium salts are acted upon by peroxide of hydrogen. The author gives these directions: Dissolve 0.25 grammes of the steel to be examined in 4 cubic centimeters of nitric acid of density 1.20; heat; add about 0.3 grammes of persulphate of ammonia. There follows a discharge of gas. Heating is continued until this discharge ceases. Then the solution is cooled. There is added 3 to 4 cubic centimeters of phosphoric acid of density 1.30. The yellow coloration due to the iron ceases and the liquid remains only faintly rose colored. Shake. By means of a pipette 3 to 4 cubic centimeters of peroxide is poured into the test tube slowly so only thin films of the two liquids are mixed at the point of contact. In the zone of contact there is now formed, if vanadium is present, a brownish-red ring. As little as 0.01 per cent. of vanadium can be detected by this method. By comparison with samples of steel whose vanadium content is known, and which are treated in the same manner, the vanadium content can be approximated. The author uses a volumetric method, which he describes, for exact quantitative analysis.—*Chemiker Zeitung*, June 21.

The manufacturers of the Gnome revolving motors have submitted a new type for test at the laboratory of the Automobile Club of France. It has four vertical cylinders and burns kerosene, having a Longuemare kerosene carbureter.—*Bulletin Officiél.* July.

The German Acetylene Society has arranged a six-day course in Berlin at which blacksmiths and welders may learn all there is to be known in practice about autogenous welding. The pupils work eight hours each day. A program of the tuition is given.—*Metall Technik*, August 13.

Don't

A FEW ADDITIONAL INJUNCTIONS TO THE TYRO AND THE EXPERIENCED AUTOMOBILIST THAT MAY STAND THEM IN GOOD STEAD IF CAREFULLY READ, REFLECTED UPON AND DIGESTED INWARDLY

Don't blame the magneto for carbureter troubles, and unless you understand the interior workings of the magneto don't take it apart.

Don't drive friends' cars unless it is necessary. If anything goes wrong you will surely be blamed.

Don't leave a car standing in the sun when it is possible to put it in the shade.

Don't use an open exhaust in towns or near houses in the country late at night; you have no right to disturb other people's sleep.

Don't think that the cheapest policy of automobile insurance is the best; what you insure for is that in case of accident you will be paid.

Don't underestimate the mileage of tires when obtaining an adjustment on tires. The tire companies from long experience know almost exactly what mileage a tire has run, and you are more likely to obtain better treatment by telling the truth than by underestimating.

Don't drive fast over loose stones. Better come down to a lower gear; it eases the engine and saves the tires from deep cuts.

Don't blow your horn immediately behind someone crossing the street or about to cross, if they have not seen you; either stop or give audible sound of your approach before you get to them.

Don't pass by horses fast on country roads; they may not be used to autos and the noise just behind them may make them swerve the wrong way.

Don't trust to luck. There is no such thing from the automobile viewpoint.

Don't rely entirely on the guidance of country people. Find out the way before you start; then you will know if the country people are giving correct information.

Don't fail to look at the level of the gasoline every time you go out; it does not take long and the habit may save you hours' delay.

Don't ask a friend to act as expert in the purchase of a used car; if it turns out wrong you will probably lose a friend. It is better to pay an expert who has spent years in acquiring knowledge.

Don't indulge in races on the high road. If another driver wants to pass you, let him; and if you want to repass him, he will probably let you.

Don't despise help proffered. If you don't want it, say so graciously; it costs nothing more to be polite.

Don't forget to take the number of a car in the following cases: Accident to yourself; to others; if you lend another autoist anything, or if you borrow anything from one.

Don't tinker with a car for want of something else to do; unless there is something wrong, leave well enough alone.

Don't go out without a spare shoe, inner tube, jack, pump, soapstone powder, tire irons, screwdriver, adjustable wrench, copper wire, insulating tape and cotton waste.

Don't take it for granted that a vicious chuck-hole won't snap the neck of a passenger in the tonneau simply because it does not affect the driver.

Don't ask a guest to read the road map and then blame him if you land eight miles outside gasoline control.

Don't drive fast around corners; the time you save by not slowing up, compared to the loss of rubber on the rear tires, is not worth it. Collisions do not often happen on straight stretches of road.

Don't sit in the car and smoke cigarettes while the passengers are pumping up tires. It might give wrong impressions.

Don't forget when passing a car that has pulled out for you to admit that you have brushed elbows with polite society.

Don't assume too much. Perhaps within a mile you may require the services of the farmer whose wheel you tried to take off.

Don't try to talk yourself out of obvious conclusions: A dead pig in conjunction with 35 miles an hour is an obvious conclusion from the farmer's viewpoint. Settle.

Don't try to argue constitutional points when a braced log-chain is athwart the radiator and its proprietor has the floor. Back away.

Don't allow your publicity man to dope out any old thing just to show that he's alive. Make him wait till he has something to say. If he waits too long, nudge him.

Don't consult the posters for information about a coming track meet. What they say is liable to be biased.

VIEWED from the vantage point of international affairs, there is no automobile organization in the United States in the same class with the Automobile Club of America. Aside from being the pioneer body in the New World devoted to motoring, this body has always occupied the leading and representative position as affecting the automobile in America in its relation with motoring all over the world.

Through its offices and machinery the American autoist who takes a tour in foreign lands is afforded advantages and conveniences that cannot be equaled. As a matter of reciprocity, the foreign motorist who wishes to tour in America finds equal advantages if he is duly accredited to the Automobile Club of America through his home organization.

From its inception this club has been a leader in everything tending to develop interest in motoring and the motor. It originated the first automobile show and conducted all the pioneer enterprises of the kind in the metropolis until the idea had be-

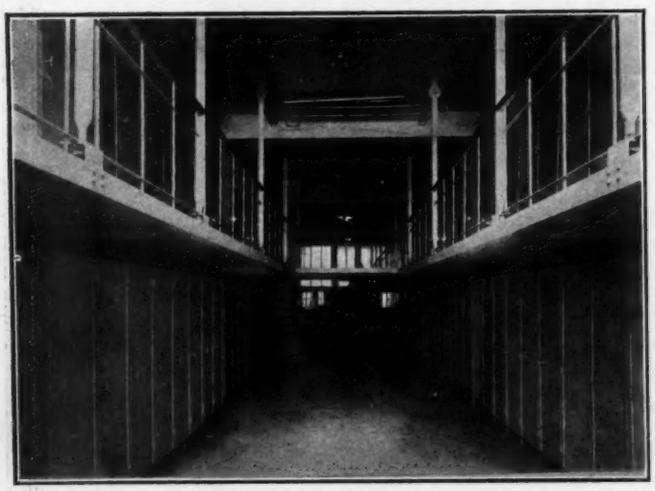
One-twelfth of the repair shop conducted by the club

come firmly implanted and had grown so as to cover the whole continent from Saskatoon to Buenos Ayres.

Its first show, conducted ten years ago, proved an instantaneous success, all space being taken by exhibitors many months in advance of its opening. There were sixty-nine exhibits and Madison Square Garden was crowded throughout the continuation of the show. One of the rules governing the affair sounds strange at this period of motor development. There was a track measuring one-eighth of a mile and the rule prohibited speeding upon it, owing to the sharpness of the curves. In spite of the speed limit imposed various kinds of tests were carried out upon the track. These included starting and brake tests and obstacle contests for steam and gasoline vehicles.

From this beginning the system of national automobile shows as it exists to-day has been evolved.

The club conducted the first endurance run ever held on American soil and for years was the main factor in automobile racing. As an organization it held its first sociability run November 4, 1899, when the club members gave a parade from the Waldorf to Hotel Claremont and return, and during its first year of existence it conducted seven short runs with much pleasure and success.



One-sixth of the locker corridor available at A. C. A.

The first racing event that attracted attention was the Blanchet Cup contest, which was won by A. L. Riker, but during the first year of its life several minor racing events were conducted.

One of the most important of the club's activities was inaugurated shortly after its birth, when the foreign relations department was instituted. At that time there were only seven recognized automobile clubs all over the world and foreign touring was almost a negligible quantity. To-day there are sixteen clubs forming the International Association of Recognized Automobile Clubs, one from each of the chief nations of the world, and the Automobile Club of America is the representative of the Western Hemisphere in its councils.

Each year from 3,000 to 4,000 Americans desiring to tour abroad are given the advantages of the club in this regard and about as many foreign tourists are received and entertained by the club. Customs, bonding, licensing and registration are all attended to, and through the introduction of the club the tourists are placed in possession of voluminous data and information with regard to travel. Owing to the fact that automobile regulation in the United States is under State and not Federal jurisdiction, several foreign countries cannot make agreements covering the exigencies of travel because they are not empowered to treat with individual States. This difficulty is obviated by the club through its relations with the Royal Automobile Club of Great Britain, which assumes to act as intermediary in customs and bonding matters where the legal obstacle referred to is interposed.

Before its first year was ended an endurance run to test the reliability of the automobile was proposed for the following Autumn.

This run developed into the famous New York to Buffalo event, which was called off at Rochester after the assassination of President McKinley. The conditions of this run seem strange when viewed from the modern point of vantage. The awards were based upon average speed. There were 87 entries and 82 starters, including several commercial delivery wagons and trucks and a few motorcycles. They were classified by weight and in night controls the entrants were allowed to make as many repairs as they pleased. This feature of the contest was provided for by the entrants by the shipment of quantities of parts and supplies to the control points, and there was a busy scene each night of the run after checking in.

On the way up-State the contestants went through a hill-climbing event on Nelson Hill, near Peekskill, N. Y., but the showing of the cars did not count in the general result, as the hill climb was regarded as a separate contest.

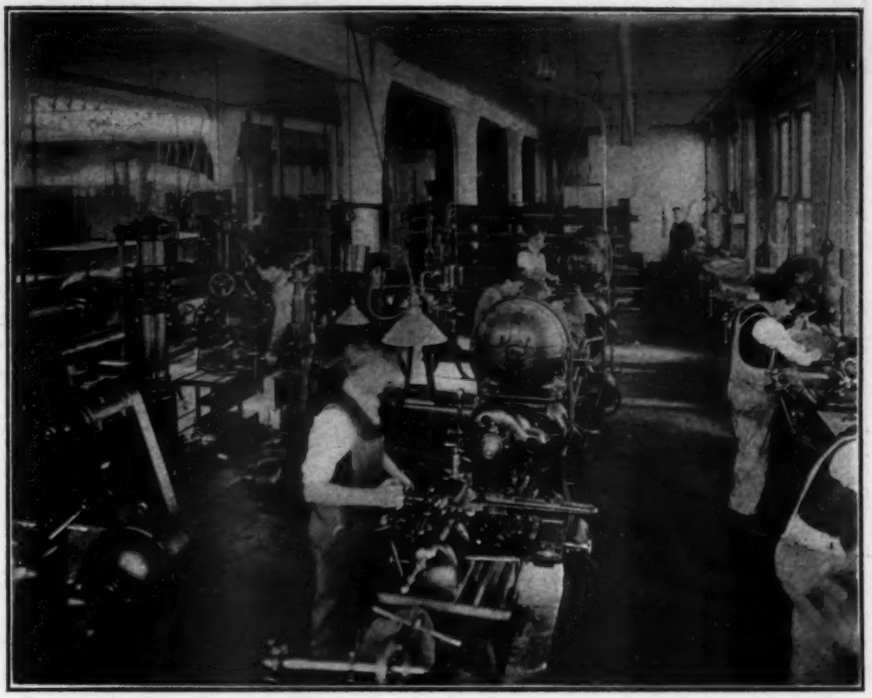
In 1902 the club conducted a reliability run to Boston and return, 488.4 miles. In this event the present general principles of the rules which govern reliability contests were outlined and foreshadowed. There were 80 entries and 75 starters in this tour. Of these 68 finished and 17 had clean scores.

The show feature continued to grow amazingly in patronage and interest and the club expanded along all lines of activity. The following year the feature was a commercial vehicle run of 100 miles over the streets of New York in which there were 13 entries. Good roads generally had been a prime object of the club from its inception and by this time the club had gained a strong foothold and exerted a powerful influence in many enterprises that have since developed into practical fruition. A dozen projects, all aimed to improve the highways, were fathered by the club and several of them are in existence to-day.

The various sporting and pleasure events given under the direction of the club since its inception are too numerous to mention. While the club still maintains its place in sport, it has a wider field and one of vastly more importance to the generality of motordom.

It is headquarters for everything that is affiliated with the automobile in America.

The club was formed June 7, 1899, with General Avery D. Andrews at its head and was formally incorporated August 16 of that year. Its first quarters were at the Astor. George F. Chamberlain acted as head of the new organization, but was not formally invested with the title of president. Aside from its official interest in sport, the club went in for social diversion and educational pursuits in its earliest period to a greater relative extent than at present. The good roads meeting held during February, 1900, proved astonishingly effective in bringing the conditions of the highways to general notice. Precisely the same arguments were used by the speakers in addressing the club that are used now with so much force to prove the many and varied advantages that result from passable highways.



One-sixteenth of the space devoted to machine shop

Albert R. Shattuck was elected president at the annual meeting and served with distinction then and subsequently. The club soon grew to 200 members and continued to expand in all directions, making particularly great strides during the administration of Elbert H. Gary, which terminated last April. Judge Gary, chairman of the board of directors of the United States Steel Corporation, devoted much immensely valuable time to club affairs and the effect of such labor is everywhere apparent in the structure of the organization.

The present officers of the club are as follows: President, Henry Sanderson; second vice-president, Robert Lee Morrell; third vice-president, Edward Shearson; treasurer, Finis E. Marshall; consulting engineer, Schuyler Skaats Wheeler; chaplain, the Rev. Wilton Merle-Smith, D.D., and secretary, Charles E. Forsdick. John E. Borne was chosen first vice-president of the organization at the last election, but death removed him since the date of election.

The quarters of the club are the most magnificent in this part of the world, at least, that are used for similar purposes.

The buildings are located between Fifty-fourth and Fifty-fifth streets west of Broadway. The main building was completed in 1906 and fronts eight stories high on Fifty-fourth street. Its carved-stone front and superb entrance give the impression of luxurious magnificence that is borne out in detail by inspection of the interior. Through a great marble hall the visitor finds entrance to the building. At the far end of this hall the way leads up a broad sweep of stone stairs to the main floor. At the head of the stairs a broad door shows the way to the grill room, restaurant and dining room of the club, while to the left is the general assembly hall, one of the finest rooms of its kind in New York or elsewhere.

Chaste columns uphold the ceiling which is so high that it seems a little dim and shadowy except in the blaze of artificial light. The floors are of polished hardwood and equal in point of space any unbroken floor surface, except in one or two of the largest hotels in the country.

Save for the fact that the bureau of tours will be quartered on the first floor when the new building is thrown open, there will be no changes on the first and second floors of the main building. The third floor at present contains the administrative offices, the executive offices and several of the department headquarters. When the new building is occupied the rooms on the third floor of the old structure will be thrown together and will be occupied by the supply department, which has grown in size and importance until it now demands more room.

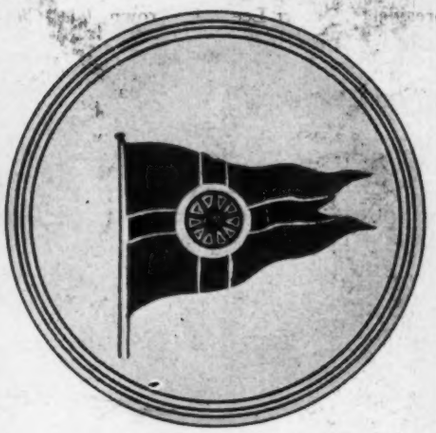
The fourth, fifth, sixth and seventh floors of the old building will not be changed in any respect, except that they will be connected with their corresponding floors in the annex. They are used as the garage and each floor will be equipped with a turntable and every other modern facility for the care of automobiles.

In the new building the eighth floor will be added to the garage equipment of the club, and in the corresponding level of the old building, which is now used as a machine shop, the partitions will be knocked out and it will also be a part of the garage, making five full floors that will be devoted to this purpose.

The new building is twelve stories in height, with a roomy and conveniently situated basement. In this basement the dynamometers of the club, of which there are two, one to test the cars and other motors, will be installed. Back in 1904, Mr. Wheeler, consulting engineer of the organization, was asked to design and build apparatus to determine the performance of cars of all kinds, and the machine that he devised was installed in 1908. It is

One-third of the live-storage room of the club

President Henry Sanderson



Emblem of the A. C. A.

Robert Lee Morrell, Second Vice-Pres.

equipped with many ingenious accessories for measuring force and speed and the advantage claimed for it is that it is possible to test a car in an hour or two and reach more definite results than by a road test covering much longer periods.

The motor dynamometer was installed in July, 1910, and was described briefly in a recent issue of THE AUTOMOBILE.

The technical committee will also be quartered in the basement.

The ground floor of both the new and the old buildings will be used largely as an entrance and exit for automobiles. The cars will enter from the Fifty-fifth street side and will leave from the Fifty-fourth street side.

The second floor of the new building will be for the chauffeurs. Every convenience will be afforded them except sleeping quarters and the arrangements planned for this department are remarkably complete and comfortable.

The third floor will contain the offices of the club, the rooms of the board of governors and committees, card rooms and some of the supply departments.

The next five floors will be devoted to garage purposes and the ninth will be arranged for the storage of parts, tires and other material for members and as a locker room. On the tenth, eleventh and twelfth floors are the machine shops of the club.

Out of a total available space of 187,159 square feet, 130,070 square feet are devoted to garage purposes, affording accommodation for more than 600 cars. The garage is open and available night and day and is equipped with modern devices of all sorts to facilitate the handling of motors. The club long ago decided to operate its garage strictly for the benefit of its members and "no commission" is the cardinal rule. Full lines of parts and accessories and the most advanced apparatus for repair work are included among the factors that have made this feature of the club favorably known throughout the world.

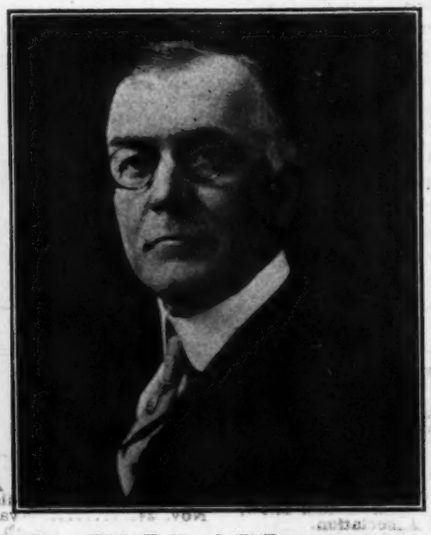
The membership of the club at the time of the retirement of President Gary was 2,055, divided into four classes, nearly 1,600 of which are active members. Since that time the growth has been normal and the total figures now are not far from 2,200. The new building will cost the club about $550,000. Needless to say the club is in flourishing condition financially.

As far as the sporting situation of the present is concerned, the Automobile Club of America is best known as the donor of the Grand Prize Cup, the second contest for which will take place October 15 on the Long Island Motor Parkway. The cup is of gold and is valued at $5,000. The club is not conducting the details of the contest.

In addition to the automobile, the club takes an official interest in aviation and motor boating.

The work of this organization is conducted on mechanical principles. The charter provides that the bulk of the detail work shall be done by committees and the formation of these committees has been a point of pride ever since the inauguration of the club as a forceful entry. The following compose the various committees of the Automobile Club of America:

Charles E. Forsdick, Secretary



Finis E. Marshall, Treasurer

Schuyler Skaats Wheeler, Cons'g Eng'r

BOARD OF GOVERNORS—Henry Sanderson, president; Robert Lee Morrell, second vice-president; Edward Shearson, third vice-president; Finis E. Marshall, treasurer. Class I (term of office expires first Tuesday in April, 1911)—Frederick D. Underwood, Waldron Williams, William Pierson Hamilton. Class II (term of office expires first Tuesday in April, 1912)—Schuyler Skaats Wheeler, Colgate Hoyt, Alfred Ely. Class III (term of office expires first Tuesday in April, 1913)—John Jacob Astor, George F. Chamberlain, George Moore Smith. Class IV (term of office expires first Tuesday in April, 1914)—Dave H. Morris, Albert R. Shattuck, E. H. Gary.

STANDING COMMITTEES—*Executive Committee*—Colgate Hoyt, *Chairman;* Robert Lee Morrell, Dave H. Morris.

Law and Ordinance Committee.—Wm. H. Page, *Chairman;* J. Dyneley Prince, Philip T. Dodge, Alfred Ely, John C. Brackenridge.

Good Roads Committee—A. R. Shattuck, *Chairman;* John Jacob Astor, Wm. G. McAdoo, Frederick D. Underwood.

Committee on Foreign Relations—Dave H. Morris, *Chairman;* A. C. Bostwick, Cortlandt Field Bishop, George Heath, J. Howard Johnston, Wm. S. Hogan, James A. Blair, Jr., W. W. Miller.

Contest Committee—Robert Lee Morrell, *Chairman;* E. R. Hollander, Henry H. Law, A. H. Whiting, Samuel B. Stevens, H. C. Pearson, Massachusetts Automobile Club.

Technical Committee—Alden L. McMurtry, *Chairman;* A. H. Whiting, A. L. Riker, Hiram Percy Maxim, M. A. Neeland, Alex. Churchward.

Bureau of Tours Committee—Colgate Hoyt, *Chairman;* Robert Lee Morrell, Dave H. Morris, George F. Chamberlain.

Committee on City Streets—Thomas Dimond, *Chairman;* M. M. Belding, Jr., Bryan L. Kennelly.

Committee on Public Safety—Winthrop L. Scarritt, *Chairman;* Henry Sanderson, Dave H. Morris, Colgate Hoyt, A. R. Shattuck, E. H. Gary.

Library Committee—J. E. Roosevelt, *Chairman;* G. Stanton Floyd-Jones, Henry R. Taylor.

Entertainment Committee—George D. Barron, *Chairman;* Emerson Brooks, H. L. Crawford.

Auditing Committee—Edgar L. Marston, *Chairman;* John I. Waterbury, Wm. M. Barrett.

Building Committee—Henry Sanderson, *Chairman;* Robert Lee Morrell, Dave H. Morris, Colgate Hoyt, J. Horace Harding.

Committee on Club Journal—George F. Chamberlain, *Chairman;* Robert Lee Morrell, W. W. Kelchner.

Membership Committee—Edward Shearson, *Chairman;* Lewis B. Brown, *Vice-Chairman;* Finis E. Marshall, Frederick D. Underwood, A. J. Hemphill, Ogden H. Hammond, J. C. Brady.

Motor Boat Committee—Henry Sanderson, *Chairman;* Ex-officio James A. Blair, Jr., George F. Baker, Jr., Henry H. Melville, Henry R. Sutphen (Motor Boat Club of America); Edgar Park, R. C. Seymour (Larchmont Yacht Club).

Aviation Committee—Cortlandt Field Bishop, *Chairman;* Dave H. Morris, Robert Lee Morrell, Colgate Hoyt, (Chas. Jerome Edwards, Samuel H. Valentine, A. Holland Forbes, J. C. McCoy, Aero Club of America).

Club counsel, Carter, Ledyard & Milburn, 54 Wall street, New York City; club attorney, W. W. Niles, 11 Wall street, New York City; club auditors, Haskins & Sells, certified public accountants, 30 Broad street, New York City.

Worcester Club Goes Up in Smoke

WORCESTER, MASS., Sept. 26—The ten rooms of the Worcester Automobile Club in the Chase Building, 44 Front street, considered the finest clubrooms in New England, were completely destroyed by fire early Thursday morning, at an estimated loss to the club and building owners of $175,000.

The fire, which started in the office of the club shortly before 5 o'clock from a defective wire, cigar or cigarette, destroyed the entire seventh floor of the building as well as the one below it. Five firemen were injured.

The automobile club is loser by about $35,000, of which about two-thirds was covered by insurance. The club's principal loss consisted of furniture and trophies.

President Daniel F. Gay has called a meeting of the board of governors for Tuesday night to be held in the rooms of the old Hancock Club at Lincoln square, and it is stated by some of the board that at this meeting a proposition to take over the Hancock clubhouse will be put up to the members of the Worcester Automobile Club, as well as those of the Hancock Club.

Correction

In THE AUTOMOBILE of September 8th these appeared a tabulation containing the specifications for the 1911 Marmon cars. In this table the price of the Marmon "Thirty-two" was given as $2,650 instead of $2,750. In this connection it may be noted that the wheelbase of this automobile is not 116 inches long, but 120 inches, as was emphasized on page 410 of the issue mentioned.

Coming Events

CALENDAR OF FUTURE HAPPENINGS IN THE AUTOMOBILE WORLD THAT WILL HELP THE READER KEEP HIS DATES STRAIGHT—SHOWS, RACES, HILL CLIMBS, ETC.

Oct. 18.....New York City, Madison Square Garden, Electric Car Day at the Electric Show.
Dec. 1.....Chicago, Ill., First Annual Aeronautical Exhibition in the Coliseum.
Dec. 31-Jan. 7, '11.New York City, Grand Central Palace, Eleventh Annual International Automobile Show.
Jan 7-14, 1911...New York City, Madison Square Garden, Eleventh Annual Show, Pleasure Car Division, Association of Licensed Manufacturers.
Jan. 15-21, 1911..Detroit, Wayne Gardens, Detroit Automobile Dealers' Association.
Jan. 16-21, 1911..New York City, Madison Square Garden, Eleventh Annual Show, Commercial Division, A. L. A. M.
Jan. 28-Feb. 4,'11.Chicago Coliseum, Tenth Annual National Automobile Show Under the Auspices of the National Association of Automobile Manufacturers, Inc., Pleasure Cars and Accessories, Exclusively.
Feb. 6-Feb. 11,'11.Chicago Coliseum, Tenth National Automobile Show Under the Auspices of the National Association of Automobile Manufacturers, Inc., Commercial Vehicles, Pleasure Cars, Motorcycles and Accessories.
Mch. 4-11, 1911...Boston, Mechanics' Building, Ninth Annual Show, Licensed Automobile Dealers' Association.

Races, Hill-Climbs, Etc.

Sept. 28-30.....St. Louis, Mo., Third Annual National Good Roads Convention.
Oct. 1.....Track, Springfield, Ill., State Fair.
Oct. 1.....Long Island Motor Parkway, Vanderbilt Cup Race, Wheatley and Massapequa Sweepstakes.
Oct. 3.....Louisville, Ky., Reliability Run, Louisville Automobile Club.
Oct. 6-8.....Santa Anna, Cal., Track Meet.
Oct. 7-8.....Los Angeles, Cal., Speedway Meet.
Oct. 8.....Philadelphia, Fairmount Park Race, Quaker City Motor Club.
Oct. 14-18.....Washington, D. C., Start of Washington Post Reliability Run to Richmond, Va.
Oct. 15.....Long Island Motor Parkway, Grand Prize, Automobile Club of America.
Oct. 15-18.....Chicago, Ill., Chicago Motor Club's 1,000-Mile Reliability Run.
Oct. 27-29.....Dallas, Tex., Track Meet.
Oct. 28-29.....New York City, New York "American's" Motor Truck Contest.
Oct.....Exhibition Auto vs. Aeroplane, Dutchess County Fair, Poughkeepsie, N. Y.
Nov. 3-5.....Atlanta, Ga., Speedway Meet, Atlanta A. A.
Nov. 5-6.....New Orleans, La., Track Meet.
Nov. 10-12-13.....San Antonio, Tex., Track Meet.
Nov. 24.....Redlands, Cal., Hill Climb.
Nov. 24.....Savannah, Ga., Road Race, Savannah Automobile Club.

Foreign Shows and Races

May 1-Oct. 1.....Vienna, Austria-Hungary, Automobile and Aviation Exhibition.

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EVERY man has his limitation, according to the statement made the other day by a well-known man who is making money in the automobile business. This authority for the "doctrine of limitation" seems quite positive about it, and he questions the accuracy of those who hold to the contrary.

* * *

WITH great frequency the Editor of THE AUTOMOBILE is addressed by young men who are attracted by the glamour of the automobile art, and they seek advice; they want to be told how to become a factor in a great and growing art.

* * *

FOR the young man who is absolutely honest, a worker, and who admits of no limitation, nothing can be easier than to enter the automobile business and take success away from the man who preaches the doctrine of limitation.

* * *

THAT the coming of the automobile has brought temporary success to many men, some of whom are of limited ability, is self-evident; even those who are willing to confess that man is limited in his ability are among those who gathered in a part of the harvest.

* * *

LOOKING for success in the automobile business today is like making a vain search for a needle in a haystack unless the searcher is honest, sincere, frank, fearless, and a worker. Does the candidate need a university education and the bolstering force of friends?

* * *

IT would be like trying to bolster up the claim of a "fallen angel" for a box seat in Paradise; the real workers would get in the way and the bolstered one would pine away in despair or slide back into the brine.

* * *

THOSE who desire to enter the automobile business and are glowing with ambition as they think, if they are merely animated with a desire to be rewarded for being on Earth, will find that the "ambition" that they are astride of is selling below par.

* * *

LET there be no mistake; the young man who desires to make a success does not even have to enter the automobile business; he will find what he wants in the way of raw material within himself. But if he is so constituted the automobile business needs him—needs him badly.

* * *

WHILE there is no limitation if the man so wills it, the fact remains that there are some serious handicaps; the man who "rests on his hard-earned laurels" is dead for the time being. Getting into a groove is like falling into a grave, only it is longer.

* * *

MOST young men, after they are afforded an opportunity to work, gather skill, just a little skill, complete some trifling undertaking, perhaps with some credit, and then what?

* * *

THEY find themselves in a sad predicament; the emolument that looked so good to them in the beginning ceases to patch out; the hats they wear rapidly shrink; in other words, the cost of a new chapeau large enough to fit a "swelled head" cannot be purchased out of a modest income.

* * *

THE work they so faithfully promised to perform is neglected; it is not fitting work for them; they want a better task to perform; the fact that some other man is doing the work more efficiently does not appeal—what can reach the center of reasoning of a man who is troubled with a dose of "swelled head"?

* * *

BUT what is a swelled head as compared with "exclusiveness"? What chance is there for the man who refuses to do anything but the particular work which attracts his discriminating (?) notice?

* * *

LEAKING is a bad habit for a ship to acquire; it is even worse in a man. Most men leak words; they talk too much; what they say will not stay said; they do not seem to understand that wisdom is as silent as a Sphinx.

* * *

RUTHLESSNESS is not an asset; the high disregard of the rights of others is the main disorder of the burglar and the cut-throat—why be ruthless? Success is neither defined nor measured by the accumulation of wealth that is not fairly acquired. The great chariot "Success" is of such large seating capacity that there is room aboard for all who are worthy.

OPPOSITION is the greatest braking mechanism that can be employed to pull down the ruthless; it will still the wheels of progress of the cruel and the greedy; it is the instrument of precision of the man who has to defend himself against the attack of the ruthless.

* * *

STRANGE as it may seem, the man who cannot "team" well with his confreres invariably gains the opposition of the most capable of them; the weaklings among them are not to be feared; it is the fellow that can do things, the man that knows that he can, who will put on the brakes if the ruthless and the greedy try to practice their religion in the camp that will have none of it.

* * *

CLIMBING up the ladder of ambition is a "boot-strap" proposition to the man who wants to thrust other men down; a real fighting, red-blooded man declines to make way; he puts up a fight; it is the fight of the man who has a principle in his keeping against the man who would not know principle if it met him coming down the road.

* * *

SHEER ability is capable of paying the interest at six per cent. on $1,000,000,000, with plenty of time left in which to court the nicest girl for miles around, marry the best woman in the world, play tag with the youngsters, be a friend to the man who may be in need of one, and offer a little encouragement to the unfortunate—if there are other duties to perform, sheer ability may be depended upon to find a way to accomplish them.

* * *

CRINGING is not teaming; it is not necessary to cringe; the companion or even the employer who wants a cringer should find them so scarce that they would come high. Should there be any for hire they are bad investments; the cringer has neither time nor capacity for becoming proficient in anything else.

* * *

LEANING backwards, trying to be honest, is the most dishonest practice that a living man can acquire; it is a clean case of dishonest honesty, if such it may be called.

* * *

SLANDERING is taught in the primary school of the blackmailer. Slander emanates from the unrestrained tongue of the irresponsible nondescript; he abides in low places, and a blight is put upon every undertaking that knows his way; nor does it matter whether or not it is in a plant for the making of automobiles or even on a newspaper.

* * *

THE automobile industry is in need of the clean and the industrious; it is in need of the man who is capable of shunning work long enough to take rest, refreshments and do a man's social duty—it is work, and more work, that has to be done; welcome is the man who will perform the tasks that await his coming!

* * *

WHAT fields of endeavor are open—automobile zones of activity—to the man who will work! There is scarcely a locked door in the whole industry. True, there are able men now holding sway behind many doors. Equally true, they are not the kind of men that are likely to stay down. When they work up, mind you, others must take their places.

* * *

TO the man who has a penchant for literary endeavor, the man who has an engineering bent and the ability to describe things as they are—not as some persons would like to have them distorted—there is a large field. Every maker of automobiles is in need of men who can take hold of the catalogue work, advertising, descriptive matter, etc.

* * *

TO the young engineer there is the drawing office; the place where the equipment is crystallized—what a splendid opportunity for a young man of working proclivities and a capacity for advancing!

* * *

TOOL-ROOM practice is now so important that a good automobile cannot be made without utilizing the services of a considerable number of tool-makers—this is a great field; it is no place for the man who has no capacity for thinking and for work.

* * *

SHOP ACCOUNTING is now regarded as of the greatest importance; it is necessary to keep track of the cost of everything without impeding the work, but the cost of the output must be determined the day it is finished—this takes brains and work.

* * *

ROUTING the work; keeping the men at the tools supplied with work; maintaining a brisk circulation; making sure that none of the work in progress will languish; nothing shall be side-tracked; just the place for intelligence of the class which wears no bells that handicap.

* * *

ELIMINATING complications in automobiles, reducing the total number of parts from perhaps 2500 to say 2000, represents an occupation that would bring vast returns to the workman who will give the matter sufficient attention, if he will be able to say when his task is completed that none of the eliminated parts will be missed when the automobile is put into service.

* * *

JUST sweeping the floor, and doing the other chores that would naturally fall to the lot of the man who is willing to work, paves the way from the lowest grade of position to the presidency of the largest company in the land. The sole requirement is to sweep the floor as perfectly as possible, being careful to collect the débris that generally hides behind half-open doors, but there is no objection to keeping the weather eye open with a view to doing other tasks if they happen along.

* * *

BEING a good salesman is something to consider, but in order to excel in this work, it is necessary to know nearly as much about the merchandise to be disposed of as the man who is responsible for its fabrication. Selling points, as they are generally perpetrated by a salesman, are plain, ordinary falsehoods projected from the tongue of the man who undertakes to paint a cabbage so that it will look like a rose—it is the truth that carries conviction.

Measuring the Wind for Aviators

METHODS USED AT ONE MEET FOR TELLING THE EXACT CONDITION OF AIR CURRENTS

TO allow of the greatest number of flights to take place at an aviation meet such as that to be held at Belmont Park, New York, in October, the first requirement is ability on the part of the aviators to tell, by some means in which they have confidence, the velocity and nature of the wind, not only near the earth, but also at various heights. A system announcing the velocity and steadiness of the air currents at 30, 100 and 200 feet above the ground, to say nothing of the services which might be rendered by means of an observation station located in a captive balloon, is recognized to be one of the crying wants for exhibitions, so long as the stability and equilibrium of aeroplanes are properties sought rather than materialized. The spectators who have paid admission, and therefore the box office as well, are interested in having all those intervals utilized for entertainment which can be utilized, and on the days when the velocity or character of the atmospheric currents changes considerably from hour to hour, a system of public announcement, such as by the sounding of gongs in conjunction with blackboard readings, not only keeps the spectators good natured, but also sets aside the doubts which might prevent the aviators from doing their best. Moreover, a record of the weather conditions, expressed in facts and figures and obtained by measurements, serves to facilitate comparisons between one performance and another.

Little has been done as yet to perfect the weather observations at aviation meets or any system for announcing and recording them. A beginning was made, however, at the meet which took place at Lyon, France, in the fore part of the Summer, and the arrangements made on that occasion may be described and, in default of more complete ones, may serve to illustrate some of the requirements.

Professor André, of the observatory at Lyon to whom the committee appointed to take charge of the matter first applied, took care to impress upon the members the need of minute precautions if illusory results should be avoided in the measurement of something so variable and unstable as the wind. It was out of question to just put up a few anemometers, such as may be bought in the open market, here and there along the level of the ground, as had been done at previous aviation meets. To raise a platform 50 feet above the field and install a station thereon would have entailed considerable expense. This difficulty was met in the following manner: A mast was raised 17 meters high and braced against the stand of the timers in the middle of the field. Being removed from all obstacles and higher than any, an apparatus at the top of this mast would not be in the path of eddies. By means of rails on the side of the mast and a pulley arrangement a wooden frame could be hoisted to the top and very readily taken down to the ground for inspection and adjustment. The choice of a suitable instrument was the next care. Anemometers used in the observatories are nearly all of the Robinson type, that is, they consist of four semi-spheres made of sheet metal mounted, with the circular edge placed vertically, upon the ends of four arms turning in a horizontal plane. The inertia of this instrument is too great for measuring feeble winds unless the semi-spheres are made quite large; and then the device, in case of being actuated by a strong gust of short duration, continues to revolve for some time after the cause has ceased. It serves very well to measure averages, but not the frequency or suddenness of gusts, and these are after all the features of greatest interest to aviators. Instead, there was adopted a very light device with inclined blades turning in a plane perpendicular upon the direction of the wind. Most devices of this type while quite sensitive are provided with a dial affording a direct reading of the velocity of the wind and they must constantly be turned by hand so as to face the wind. To obviate these two shortcomings the device was combined with a weather vane, which would automatically correct its position to the wind, and the dial mechanism was replaced with a simple gear which closed an electrical circuit once for each turn of a light spur-wheel meshing with a small pinion on the axis of the device. It was then easy to measure the velocity of the wind as well as its regularity by the dots produced by the electrical contacts on a roll of paper unwound by clockwork at the foot of the mast.

As the anemometer device employed was set in motion as soon as the velocity of the wind reached 10 centimeters per second, it was necessary to employ a weather vane of equal sensitiveness. It was constructed of a light wooden frame covered with aeroplane cloth so as to form a dihedral angle of about 5 degrees, and this shape was chosen so as to avoid the oscillations which would certainly result if a single plane were placed in the little eddies which would be formed directly behind the vertical shaft of the weather vane. These surfaces measured 0.4 by 0.4 meter and were supported by a wooden arm measuring 0.7 meter, in such manner that the distance from the center of gravity of the planes to the shaft was not less than 0.5 meter. The weight of this weather vane apparatus was exactly balanced by a piece of lead carried on a stem extending on the other side of the vertical shaft. The balancing was done with great care with a view to having the weather vane function with correctness even if the mast were not exactly perpendicular—and some flexion of the mast was to be expected, considering its dimensions and its rather weak support. The shaft of the weather vane was mounted in ball-bearings, and under these conditions the apparatus placed itself perfectly in a current of air as slow at one-tenth to one-twentieth of a meter per second, even when its shaft stood at an angle of 30 degrees with a plumb line. Finally, the anemometer device was attached by means of a little clamp to the top of the shaft of the weather vane.

In order to get readings of the direction of the wind, rather than providing the vane with an index hand displacing itself over a fixed rose it was preferred to use a fixed index and to mark the rose on an inverted truncated cone secured to the weather vane. In this manner it was possible to read the direction, even from the foot of the mast, with considerable accuracy and without displacing one's self in order to face the index.

The calibration of the apparatus took place in a large closed hall. It was moved against the air a given distance, and a large number of tests made at different speeds resulted in establishing the figure of 3.20 meters as practically a constant for the distance covered between two contacts. The transmission of current took place at one end through the metallic mass of the device and through an insulated bronze ring at the lower end, against which there leaned lightly a small fixed brush also insulated. The closing of the circuit thus obtained was utilized to ring a bell placed in the interior of the station and connected to the instrument by a flexible wire. By measuring with a stop watch the time elapsed between two consecutive rings of the bell the time was obtained in which the wind covered 3.20 meters, and the velocity in meters per second was read off by means of a corresponding schedule prepared in advance. In reality the elapsed time was not measured between two consecutive bell signals, but between ten such, corresponding to a distance of 32 meters.

This acoustic method of signaling was found very convenient,

as the bell could be heard at a distance of several meters on the outside of the station, so that every variation in the speed of the wind was noted by every person in the vicinity. In addition, every signal was recorded, as above mentioned, by a chronographic register, so as to check all readings.

The station was also equipped with barometers, thermometers and hygrometers, all self-registering, which rendered it possible to record with considerable accuracy all the meteorological conditions under which flights were made, and twice each day telephonic communications were received from the observatory announcing whatever changes in the weather appeared to be approaching.

Events Among Aviators

HISTORICAL associations surround with glamor the feat of Georges Chavez, who crossed the Alps in a Blériot monoplane on Sept. 23. The Italian Aviation Society had offered a prize of $20,000 for flying from Brigue, Switzerland, to Milan, Italy, by way of the Simplon Pass, whose altitude at the lowest point is about 7,000 feet, but unfortunately the young aviator after accomplishing forty miles of flight at the high altitude and braving fierce currents rising from the steep Italian side of the mountains, undertook to descend by gliding to Domodossola, an aeronautic station located on the plain on the way to Milano. When arrived within fifteen feet of the ground he lost control of the machine, whether this was due to a sudden upward swerve at high speed or to a gust of wind, and the machine turned a somersault and came down on top on Chavez, breaking both his legs and inflicting contusions on face and shoulders. As his recovery at first seemed probable, a committee of the Italian Aviation Society began to raise a $10,000 consolation prize for him, while a penny subscription was started for the purpose of erecting a monument at the spot where he landed, to commemorate the first human flight across the mountains which Hannibal, the Visigoths and Napoleon had crossed with their armies only at great peril and with much loss of life. But on Sept. 27 Chavez succumbed to his injuries.

On Sept. 19 Chavez made his first attempt, but found the tops of the Simplon enveloped in clouds and returned safely to Brigue. Thereafter he explored the mountain daily by automobile, and on the day of the event he came rushing down from Simplon Kulm, reached Brigue at 1:30 p. m., took the monoplane out of its shed, mounted it and had it started, and at 1:40 the spectators caught the last glimpse of him disappearing over the hazy outlines of the mountain peaks. The telephone announced that he had passed the Kulm at a height of 450 feet. Another message a few minutes later said he had passed Gondo. But the bell rang again, and now he had fallen at Domodossola. Just before he started, Henry Weymann, an American aviator favorably noticed for his gallant work in the Eastern Circuit contest in France and for his subsequent attempt at winning the large Michelin prize for reaching the Puy de Dôme with a passenger in direct flight from Paris, had returned from a vain attempt at the same coveted feat, having found that his Farman biplane was unable to reach the altitude necessary for crossing the mountains. Chavez was born in Paris 23 years ago and gained fame among aviators in the beginning of this month by beating Morane's altitude record. Rising from Issy-les-Moulinaux he reached the height of 8,792 feet in 41 minutes.

Much discussion has been stirred up among aviators with regard to the reasons for the accident which befell Chavez. He came down in gliding flight with the motor idle, and it is the opinion of many monoplane operators that this method of descending is dangerous because, in case of a sudden cross current in the atmosphere which disturbs the equilibrium, the aviator is deprived of the motor power as a means for regaining his balance quickly by spurting forward.

Hubert Latham and Louis Bréguet have been nominated for decoration with the cross of the Legion of Honor for meritorious work in connection with French military aeroplanes.

W. K. Vanderbilt, Jr., has ordered a Blériot monoplane provided with a 60-horsepower Gnome motor and an auxiliary motor of smaller power to be used either in combination with the main motor or as auxiliary when the latter is incapacitated. It is said to be ready for delivery and capable of fantastic speed.

On Sept. 16 Aubrun flew a Blériot machine 186.3 miles in 3 hours 33 minutes and 7 seconds, making an average speed of about 55 miles per hour, and breaking the record for combined speed and distance.

Two aviators, Loridan and Mahieu, attempted on Sept. 26 to make the flight from Paris to Brussels, for which the city of Paris and the Aero Club of France had offered prizes totaling $35,000, provided the flight was made with a passenger and finished on the day mentioned. Loridan reached St. Quentin, 81 miles from Paris and about one-half of the required distance, and fell from a considerable height, injuring himself and the passenger. Mahieu reached nearly as far, but fell from a height of 60 feet near Lafère. Both he and his passenger escaped injury.

The National Council of the Aero Club of America has sanctioned the conditions for a race from Chicago to New York, as outlined by the New York *Times* and the Chicago *Evening Post*, which jointly offer a prize of $25,000 for the winner. The race is to start from the Hawthorne race track, near Chicago, on October 8, if the weather permits, and must be finished in New York City on or before October 15. At least three competitors must start, and the start may be postponed from day to day on account of bad weather, which provision leaves a considerable element of uncertainty, if one or two elect to start, considering the weather sufficiently favorable, while the third competitor holds back and possibly does not start at all. Between the start and the finish the competitors may descend and rest and repair as they please. A large number of competitors have been announced from time to time. An additional prize of $5,000 has been offered by Clifford B. Harmon, a well-known amateur aviator of New York City. The fliers are supposed to follow the old automobile route via South Bend, Toledo, Cleveland, Buffalo, Rochester, Syracuse, Albany.

At Belmont Park, New York, preparations are being pushed for the great international aviation meet to be held October 22 to 30. Sheds for housing the machines of the contestants are now being erected and when finished will be at disposal for all aviators officially entered in the meet, and they may thereafter begin practicing flying when they choose. J. C. McCoy, chairman of the committee on aviation, announces the following entries: Leblanc (Blériot), Latham and Thomas (Antoinette), Lesseps, Morane and Aubrun (Blériot) and Simon, all from France; Graham-White, Radley and Ogilvie from England; Moissant and Weymann, American aviators flying French machines, and the American aviators Charles K. Hamilton, Walter Brookins, Ralph Johnstone, Thomas S. Baldwin and Tod Shriver. The ground at Belmont Park has been cleared of all obstructions and presents a clear field, with the exception of the pylons, which are slender towers serving to mark the course of contests. What was the old betting ring underneath the grand stand has been transformed into an exhibition hall where flying machines, automobiles and other things connected with outdoor sports will be exhibited, and arrangements are made for a restaurant service which will render a whole-day stay at the grounds practicable.

The Muffler on Aviation Motors

A good muffler absorbs only about 8 per cent. of the power developed in a single-cylinder motor. While the loss is usually somewhat larger in a multi-cylinder motor, it is on the other hand reduced about 80 per cent. before it reaches the propeller, owing to the inefficiency of the latter. The loss in propulsive power in applying a muffler to the motor of an aeroplane engine would therefore at the present stage of propeller efficiency not exceed 2 per cent., and the return in comfort as well as in ability to hear other motor sounds would compensate for this small loss. The additional weight of a muffler for a 50-horsepower motor is estimated at 10 to 15 pounds, including the exhaust tubing required for reaching it.

Auto Show of 1911

MOST COMPLETE LINE OF CARS EVER EXHIBITED UNDER AUSPICES OF A. L. A. M. WILL GRACE MADISON SQUARE GARDEN IN JANUARY

ACCORDING to all indications, the coming Eleventh National Automobile Show, which will be held at Madison Square Garden from January 7 to 21, 1911, will set a new mark in that important branch of motor activity. While it is still three months before the doors will be thrown open to the public, all space has been assigned for the first section of the show as shown in the accompanying series of illustrations.

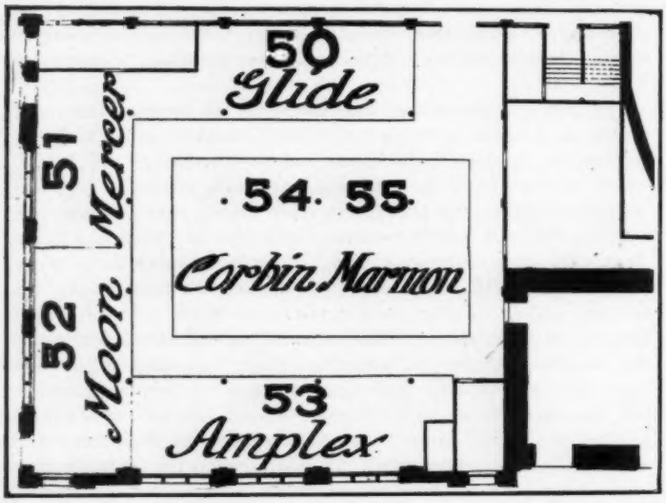


Diagram showing disposition of space in Exhibition Hall

The exhibition of 1911 is divided into two parts. The first will be entirely devoted to the display of passenger or pleasure cars and will last until January 14. The commercial or freight vehicles, electrics and motorcycles will be on show beginning January 16 and will remain until the night of January 21. The parts and accessories display will run through both weeks of the exhibition.

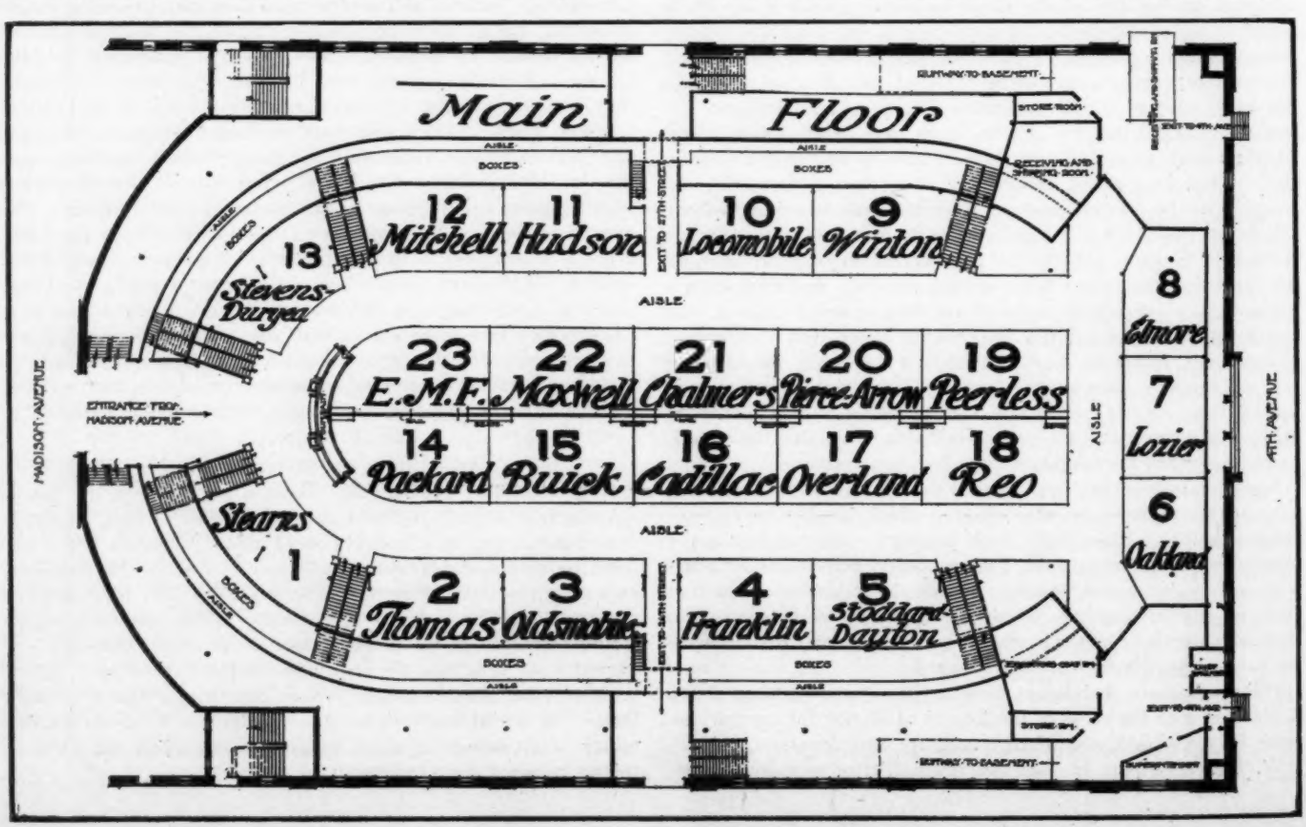
The main floor of the garden will contain twenty-three exhibits, thirteen of which will be strung around the outer edge of the big exhibition room. In the center there will be ten exhibits, while those in the big circle will be divided from the center block by wide aisles. Around the outside of the big circle the boxes will be arranged and still farther out from the center an aisle will afford easy passage about the hall.

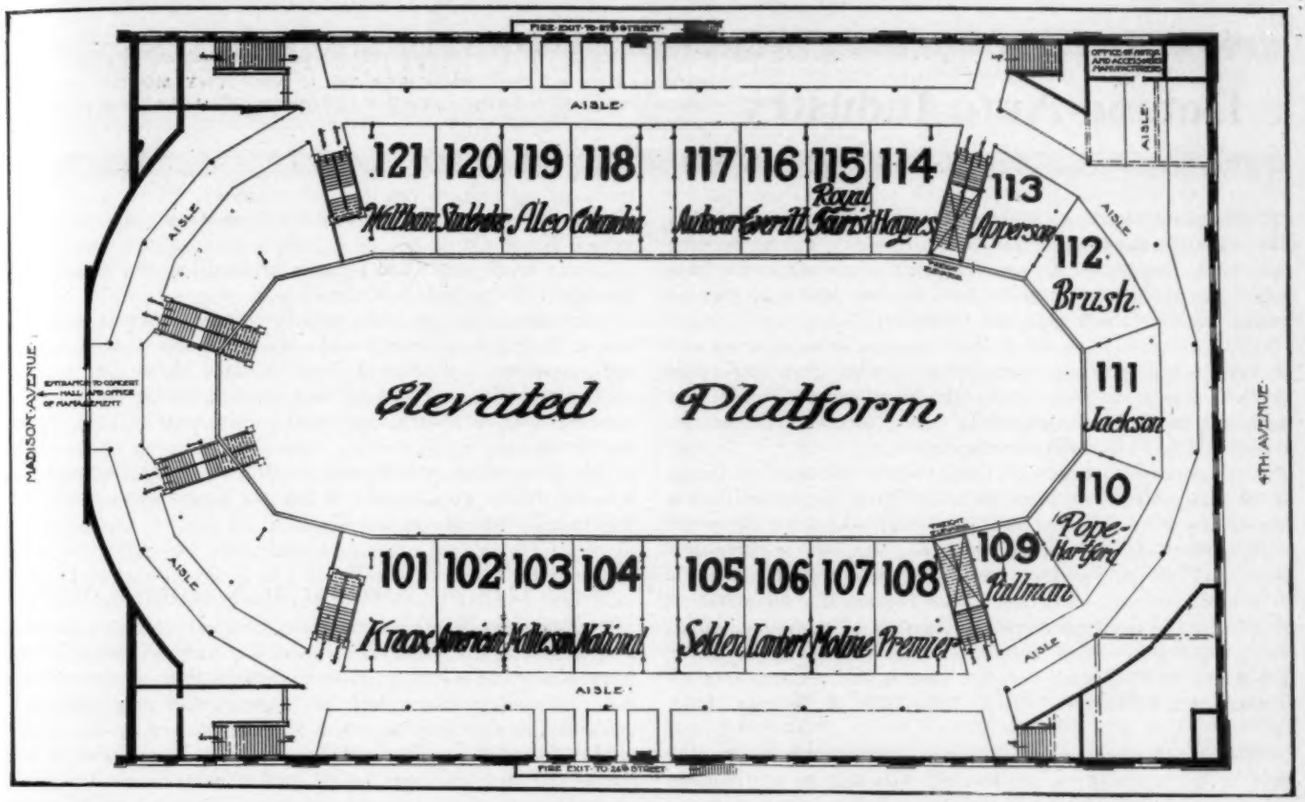
On the elevated platform twenty car exhibits will be quartered in a magnet-shaped formation which will be encircled by a wide aisle to give opportunity for close inspection by the public.

Exhibition Hall will contain six car exhibits and in the balcony there will be twenty more in the same formation as that followed on the elevated platform. Thus sixty-nine exhibits by as many distinct automobile companies will be shown during the first seven days of the national show. Nothing like as complete a line of cars made by licensees under the Selden Patent has ever been shown, because during the past year the membership in the Association of Licensed Automobile Manufacturers has increased materially and several newcomers will exhibit their product.

The foreign cars licensed under the patent will be well represented and the domestic field will be about as complete as it is possible to make it.

In order to provide space in the garden under this plan, a number of radical changes will be required in the main floor. Preparations for these changes will be made with a wealth of detail so that when the time comes for the alterations the girders and supports that will be used in changing the interior can be moved in and bolted together in the shortest possible time.



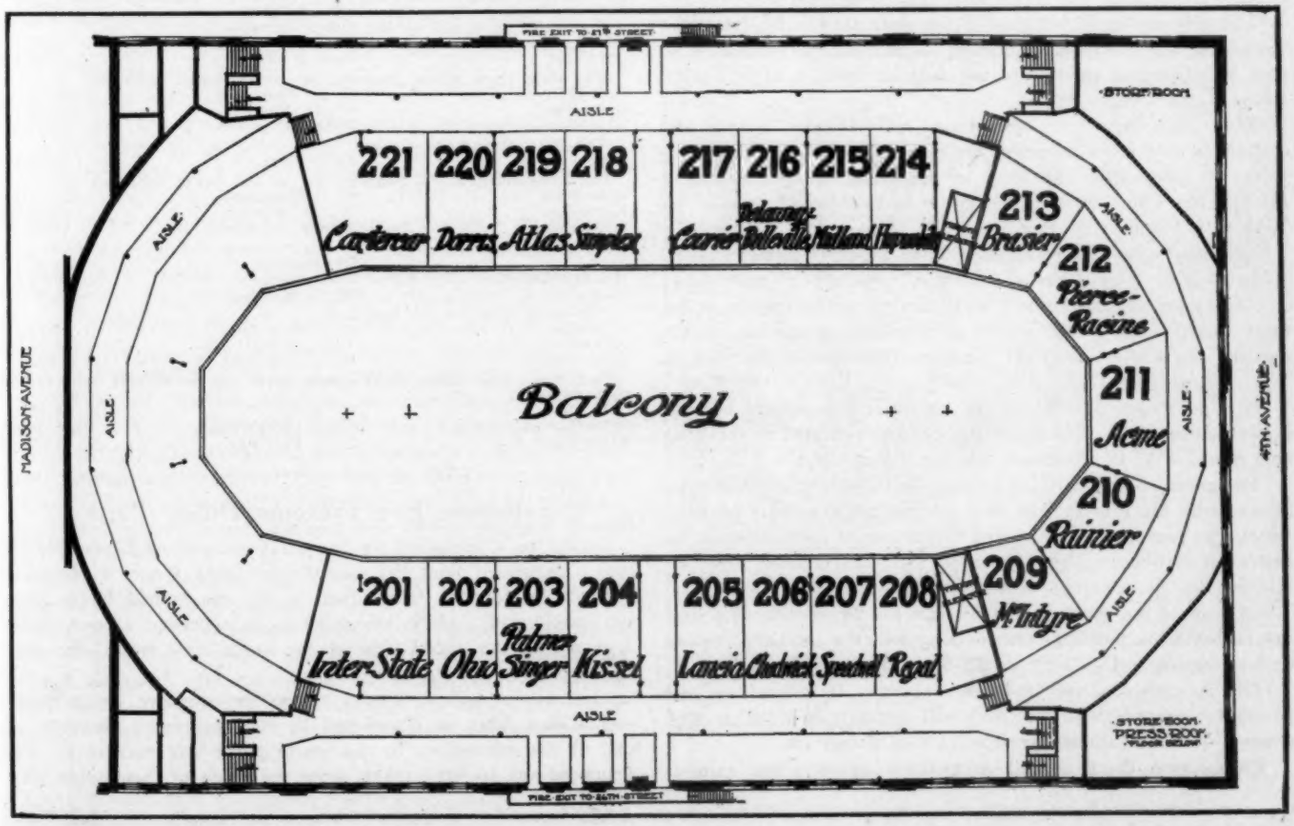

FIRE EXIT TO 51ST STREET
AISLE
121 120 119 118 117 116 115 114 113
Wallham Studebaker Alco Columbia Autocar Everitt Royal Parisian Haynes Apperson
112 Brush
111 Jackson
110 Pope-Hartford
109 Fallman
101 102 103 104 105 106 107 108
Knox American Matheson National Selden Lambert Moline Premier
Elevated Platform
MADISON AVENUE
4TH AVENUE
FIRE EXIT TO 24TH STREET

The decorative scheme has been worked out and according to announcement it will be more artistically beautiful than ever before.

Public interest in the National Automobile Show has always been intense and this year, with the growth and development of the industry, it is expected that the attendance will be larger than it was at the previous high-water mark. The musical programs, which are now being arranged, will be very complete and all indications point to the highest class of entertainment of that kind.

Society will be represented to a larger extent, this being foreshadowed by the early reservations.

The committee in charge of the enterprise consists of the following: Chairman, Colonel George Pope; Charles Clifton, President of the A. L. A. M.; Alfred Reeves, General Manager of that association, and Merle L. Downs.



Defend Auto Industry

CHIEFTAINS OF THE BUSINESS TELL WHY THE MOTOR CAR WILL REMAIN A PERMANENT FACTOR IN CIVILIZATION AND MODERN DEVELOPMENT

THE recent attack of banking interests upon the automobile industry has led to expressions of opinion on the permanency of the automobile by numerous men prominent in the business. In a symposium compiled by *American Industries* the following statements will appear in October:

"Probably the best answer to the charge of overproduction can be answered by pointing to the export trade. Had there been any real over-production, automobile manufacturers would have turned to the foreign market long before this."—F. B. Stearns, president The F. B. Stearns Company.

"The tendency to luxurious living, which has been attributed to the automobile, is no more the result of the motor car than is any of the other thousand and one things which contribute toward making life more luxurious than it was two or three decades ago."—H. H. Franklin, president Franklin Automobile Co.

"A great hullabaloo has been raised because the automobile is diverting trade from speculation, the purchase of jewelry, millinery and has taken money from saloons and resorts. In so doing, it is doing much to unite families, parents and children in their recreations and pleasures."—E. R. Thomas, E. R. Thomas Motor Co.

"With the big end of the business still untouched (that of building delivery wagons and trucks), it is safe to say that the industry is still in its infancy and has a future ahead of it too gigantic for any of us to even conceive."—R. H. Salmons, general manager Selden Motor Vehicle Co.

"Whatever volume of money has been expended in motor cars, represents money in motion. And that money in motion has kept busy the wheels of industry during and after the panic of 1907."—Alexander Winton, president The Winton Motor Carriage Co.

"We do not believe there is any over-production of high-class or high-grade cars."—L. W. Rinear, The White Co.

"There is no doubt but that in the near future the American motor car manufacturer will have to give liberal acceptance to that logical outlet channel in the foreign field."—N. I. Taylor, Regal Motor Car Co.

"From this period of transition will emerge, strong and capable, a coterie of immense, well-managed firms of manufacturers to enter upon the work of supplying the public with a product for which there will ever be an established demand."—Walter E. Flanders, E-M-F Co.

"Transportation is civilization. Time saved is money made."—Maxwell O. Parry, Parry Auto Co.

"The motor car has become as necessary to the farmer as his most valued farm machinery by putting him nearer his market and his friends."—George M. Dickson, National Motor Vehicle Co.

"It is no longer possible to sell an automobile simply because it is an automobile. The public has become educated to their use and value."—W. B. Roberson, Alpena Motor Car Co.

"The automobile is with us to stay, and neither the pessimistic banker with his four or five cars, nor the stock jobbers of Wall street, can prevent the increasing utilization of such an essential factor in civilization as the motor car has become."—R. W. Hutchinson, Jr., Pullman Motor Car Co.

"So long as the common people class the automobile as a luxury rather than a utility, just so long will the industry require tender nursing."—O. R. Hardwell, Sears, Roebuck & Co.

"The farmers who will be large consumers in future have the money to purchase with and they will certainly spend it as they choose."—G. A. Mathews, president Fuller Buggy Co.

"Competition there is and competition aplenty, but ruinous rivalry will not enter where so much is at stake."—H. A. Lozier, Lozier Motor Co.

"There is an outlet for all cars of merit in this country."—George C. Holtz, Badger Motor Car Co.

"The automobile has come to stay because it brings to a live people increased facilities for the transportation of both freight and passengers."—Charles H. Pope, Midland Motor Co.

"The country is not bankrupting itself in buying autos, but is demonstrating its progressiveness and prosperity."—D. M. Parry, Parry Auto Co.

"The commercial vehicle will be an indispensable proposition and will be of great benefit in all the larger cities."—W. W. Sterling, Elkhart Motor Car Co.

Field Day for KlineKar at Norristown Meet

PHILADELPHIA, Sept. 24—Six races, a couple of time trials and several motorcycle races constituted the card presented by the Norristown Automobile Club at the Narberth race course, near this city, to-day. Two stock car events under piston displacement classification were won by a KlineKar driven by C. C. Fairman and a third event by a Warren-Detroit. The KlineKar was opposed in both its races by two other KlineKars. The same KlineKar won the free-for-all handicap. The free-for-all at five miles was won by a Fiat and the program concluded with a freak "secret" time race at two miles, which was won by an Otto car. In the time trials at one and ten miles a Fiat made :49 1-5 and 8:31 1-5 respectively. As the automatic timing devices were out of order, it is unlikely that either mark will stand.

The summary:

Car	Driver	Time
One-mile time trial—		
Fiat	De Palma	0:49 1-5
Five-mile race, 231 to 300 cubic inches—		
Warren-Detroit	Tom Berger	5:23 4-5
Otto Car	Geo. H. Jones	5:39 1-5
Five-mile race, stock chassis, 301 to 450 cubic inches—		
KlineKar	C. C. Fairman	5:58
KlineKar	W. D. Morton	5:28 1-5
KlineKar	James D. Kerr	5:34 1-5
Ten-mile time trial—		
Fiat	De Palma	8:31 1-5
Ten-mile race, stock chassis, 301 to 450 cubic inches—		
KlineKar	C. C. Fairman	10:44 2-5
KlineKar	W. D. Morton	10:44 3-5
KlineKar	James D. Kerr	10:45 1-5
Five-mile, free-for-all—		
Fiat	De Palma	4:57 2-5
Warren-Detroit	Tom Berger	5:03 2-5
Otto Car	W. J. McFarlane	5:06 2-5
Ten-mile, free for all, handicap		
KlineKar	C. C. Fairman	10:32 1-5
KlineKar	J. D. Kerr	10:32 2-5
Otto Car	W. J. McFarlane	10:33
Two-mile race under legal speed limit (secret time 6 minutes 30 seconds)—		
Otto Car	W. Kruse	6:08
Otto Car	W. J. McFarlane	6:06 1-5
KlineKar	C. C. Fairman	5:57 2-5

Salisbury Fire Prevents House Party

Owing to a visitation by fire on the night of September 21, which destroyed plant No. 2 of the Salisbury Wheel & Manufacturing Company, at Jamestown, N. Y., the annual house party of the company, which has come to be regarded as one of the features of the social side of the automobile trade, has been called off.

The building will be a total loss to the company, and arrangements have been so disordered by the occurrence that the recall of the invitations to the house party was necessary. The function was to have taken place the week of September 30.

Land of Motoring Promise

BY HENRY MacNAIR. GOOD ROADS AND NATURAL WONDERS IN THE OFTEN OVERLOOKED STATE OF MAINE. TIMELY SUGGESTIONS FOR OCTOBER TOUR

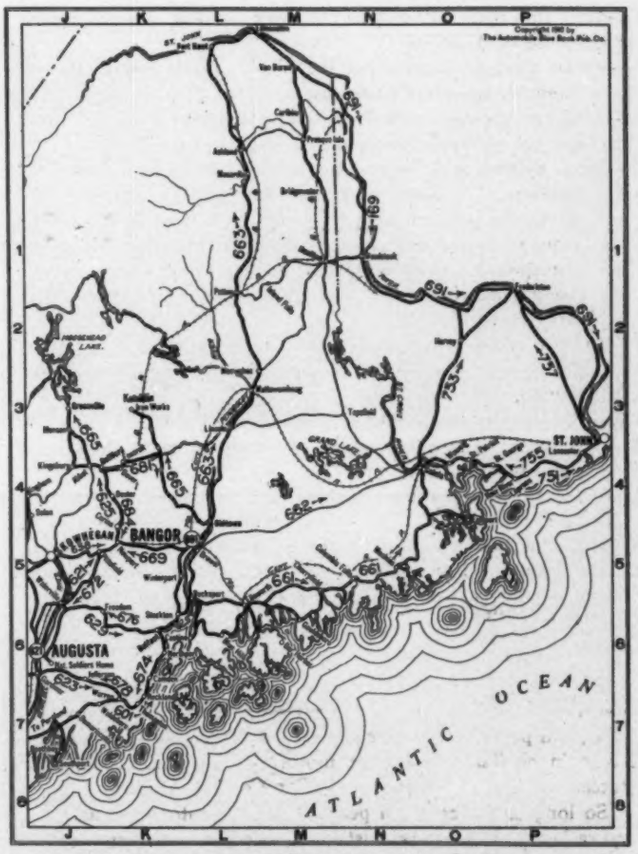
NOT alone to the explorative tourist who has wearied for the nonce of the furrowed telford and hummocky macadam which betoken the lanes of the rabidly strenuous, but to the seeker after recuperative delight in the restful haunts of nature does Maine's varied expanse of forest and lake make seductive appeal. Maine, the eastern outpost of the "States," with its lace-like fringe of coast, and its five thousand laughing streams which call up alluring visions of conquest with net and rod!

Since 1614, when Captain John Smith ranged the New England coast from the Penobscot to Cape Cod, countless thousands have journeyed to that romantic primeval land whose charm has oft been told in song and story. Mason and Gorges planted colonies on its jagged coast, then Massachusetts reached out a long arm and embraced that portion of "Ye Mayne Land" so-called to distinguish it from the many bordering islands. For a hundred and sixty-eight years it remained the District of Mayne, in turn devastated by torch and tomahawk, and rent with cannon and bayonet. At last came its days of peace, and the Pine Tree State has become the playground of the Nation, the rendezvous of the mighty Nimrod, the haunt of the mute inglorious Walton. But the motor car held back, and he who braved the mountain fastnesses of this *terra incognita* was a pioneer indeed. Few knew, and many need now to be told, that the State of Maine has more miles of excellent natural highways than any of its New England neighbors. Few indeed are there who can tell of Maine's fifteen hundred lakes, of her twenty-five hundred miles of coast, and fewer still of her five thousand miles of touring roads. The misconception of road conditions in this, the largest and in many respects the most interesting of our Eastern States, is due in part to the fact that the poorest of her highways are on the New Hampshire border; her gateways seem closed to the motorist. He ventures along the sandy banks of the Androscoggin, or the Saco, he returns and essays the rough and stony road which leads from ancient Kittery to Portland's promontory, and retires in disgust at what seems to portend a halting, limping journey through a wildnerness. But let him push on along the coast to Bangor, or ascend the peaceful Kennebec to Moosehead Lake, then no slight discomfort of the road will abate his enthusiasm for the glorious and ever-changing panorama which has been so prodigally laid out before him.

Rangeley Lakes and Poland Spring were formerly the *"Ultima Thule"* of the automobile tourist, but of late days the doughty motor chugs its way to northernmost Fort Kent, to Eastport and on through quaint old St. John with its reversible waterfall, or climbs the international range of hills and descends the beautiful valley of the Chaudiere to the walled and historic Quebec. These and many other delights are his who ventures far afield, though none need seek beyond the confines of the State for abundant enjoyment of wheeling over smooth and picturesque roads. One who has traveled from Bangor to Moosehead will always pleasurably recall the twenty-mile stretch along a ridge which the natives call a "hossack." How the dial-finger pointed continually at thirty or thirty-five or forty, with never a "Thank-you-marm" to disturb his gears, or his equipoise. And then the drive down the east side of the majestic Penobscot; who could ever forget it? Unless perhaps the memory of its manifold beauties was eclipsed by the subsequent trip along the coast near Rockland.

What more would you have in this list of good things which Dame Nature has provided for Maine's perennial feast to the eye and the soul? Poland Spring, for more than a century the resort of the aristocratic and wealthy, its beneficent waters known on both sides of the Atlantic, its quietly restful surroundings appealing to all but those inoculated with speed-mania. The chain of lakes known as Rangeley Lakes, but individually known as Mooselookmeguntic, Welokennabacook, Molechunkamonk and others, bountifully stocked with the finest of trout and bass; and nearby accommodation for the tourist in the finest of hotels, in a comfy log cabin or in a tent. Portland with its famous lighthouse, its unapproachable Casco Bay, its Longfellow houses, and its top-story dining rooms. Augusta with its Capitol and Blaine residence, overlooking the ice-yielding Kennebec. Belgrade Lakes the beautiful, meant only to drive dull care away. Auburn and Lewiston, the twin cities of the Androscoggin, busy in their making of cotton and woolen goods. Rockland and the stretch of unequaled coast, whose beauty can only be known to him who sees. Bangor on the Penobscot, standing at the doorway of the magnificent Aroostook country, a center for many charming tours on unexcelled gravel roads. Moosehead Lake, the source of the Kennebec, with its four hundred miles of shore line, its islands and hunting and fishing camps.

Then, too, are the vast forests of the North where abound the moose, the caribou and the deer, delimited by the majestic rivers St. John and St. Croix, with their many tributary streams and lakes. All this and more goes to make an ideal spot for the annual gratification of our wanderlust, where we may forget the dull grind of commerce and like Walt Whitman "invite our souls."



PRACTICABLE MOTOR TOURS IN EASTERN MAINE

[Reproduced by permission from the Official Automobile Blue Book. The numbers on the heavy lines refer to corresponding routes in the New England volume.]

H. H. Franklin Interviewed

PRESIDENT OF THE H. H. FRANKLIN MFG. CO. IN RESPONSE TO QUERIES BY "THE AUTOMOBILE" GIVES HIS VIEWS ON PRESENT SITUATION

A—What is the attitude of the banks?

A—The usual attitude—by that I mean that the bankers will look upon automobile propositions just the same as they would any other legitimate mercantile establishment. My experience with the banks has been that they are not unduly alarmed.

B—Is there much paper out?

B—While not fully informed I was surprised during a slight investigation that there was not apparently an abnormal amount of paper out.

C—Will the various makers of automobiles be able to meet the payments as they come due?

C—Answer to this question depends on what is meant by "various." Conservative, well-conducted concerns will certainly be able to meet their payments.

D—To what extent will the paper that is out be extended?

D—Not informed.

E—How are the accessory makers making out?

E—Not informed, but do know that indications are that these manufacturers have caught up with their orders, and are apparently in position where they can handle the requirements of the business.

F—What will be the automobile output for 1911?

F—Not to exceed one-third of 1910. There is reason to believe that the 1910 output as to number of automobiles will not be exceeded for many years.

G—Will the 1911 automobiles be high or low priced relative to the 1910 output?

G—Prices as fixed seem about the same. Trade conditions will undoubtedly affect some prices.

H—Will the present method of selling continue? If not, what are the probable changes that will be made?

H—No. Selling will be on the same basis as any legitimate business. A basis upon which it has been conducted up to the present time. A cash basis will also be done away with, and this phase of the situation should be given considerable attention by the manufacturers, for it is certainly more expensive to do business on a credit basis than on a cash basis.

I—Will the prosperous makers of automobiles, like the Franklin, get behind the weaker companies and keep them from going to the wall?

I—No. Not anything would be gained if they did.

J—Will there be a combination of interests more than is in sight at the present time?

J—Not informed; but not anything will be gained at this time by a combination.

K—Will the Knight type of motor be taken up in this country?

K—Very likely. The tendency, of course, in this country is to take up and look into anything that looks like a development.

L—Will the Franklin company do anything by way of adapting rotary valves?

L—Franklin engineers at this time do not see anything in the rotary valve.

M—What is the greatest extravagance in the automobile business, in other words, what points are there that can be manipulated that will lead to a lower cost of production?

M—The whole automobile business has been on an extravagant basis. The rapidity with which changes and improvements have been made has added very much to cost. The main thing that will lead to lower factory cost will be standardization, fewer changes, better organizations, special machinery, etc.

N—What is the exact reason for desiring to use large tires on automobiles? Please deliver exact data on this point.

N—Solely for economy and freedom from tire troubles. To best illustrate this point, I will say that the better class of cars carry the same tire equipment which is carried on the Franklin cars and use from three to four sets of tires to negotiate 10,000 miles, while our one set of tires average us the same distance. This statement is not made from any theoretical estimate but from actual facts substantiated by owners of the Franklin car from whom we have gained the information.

O—How is the second-hand car question to be handled?

O—On a strictly business basis.

Communications

Regarding the attitude of the underwriters in connection with gasoline trucks not being allowed on the docks of piers in New York City.—Many of the leading firms in New York are to a great extent bound up with the docks in view of the fact that a percentage of their goods are imported.

As you are well aware a properly constructed gasoline truck with a properly constructed gasoline tank is as immune from fire as an electric vehicle. In other countries, England to wit especially, the underwriters, insurance companies, etc., insist upon inspection of the gasoline tank and after approval no further question is raised about their going in and out of the docks and piers.

We would point out that New York possesses some of the finest docks in the world, far superior in construction and protection against fire to any others that have been the writer's lot to view. Around London there are still many wharfs and docks constructed solely of timber, and these would be more liable to catch fire than your superb New York wharfs. The English Board of Trade statistics have shown that during the last two years not one single case of fire has occurred through the entry of gasoline trucks on their premises. Considering that the handling of goods, due to the enormous imports and exports of London, are, we believe, very much greater than those of New York, and taking into consideration again the fact that New York piers have better protection against fire than the London ones, it beats us entirely to appreciate the underwriters' attitude.—W. A. Wood Automobile M'f'g Co., Julian A. Halford.

Should makers guarantee their car indefinitely?—It has occurred to me that the one thing that will build up the automobile situation is to get a value on second-hand cars. To-day a second-hand car has little or no value from a factory standpoint, that is, I mean to say that a new car is sold with a guarantee against defects and all faulty material so long as it remains in the hands of the original buyer, but the moment it has been sold and it is in a second man's hands the factory disclaims any responsibility whatever.

Now, the factory that will come out and guarantee their cars so far as to replace any defective material free of charge at any time, in other words, guarantee their cars for life, will immediately place a value on the second-hand car which will materially affect those who have been attempting to borrow money from the banks on automobiles. That is to say, the banker will see some kind of value in an automobile. To-day the banker sees no value in an automobile and most bankers that I have had the pleasure of talking with during the last month consider an automobile a liability rather than an asset of its owner.—A. R. Mosler & Co., C. C. Boynton, General Manager.

General Motors Deal Still Pending

Rumors, and then some more rumors, all false, with regard to the financial plans of the General Motors Company have been vigorously circulated during the past week. The sale of bonds to Chicago and Michigan capitalists has been alleged and denied, and the same may be said for the Boston deal which is said to involve $2,500,000, and Tuesday and Wednesday of this week a report outlining an immense underwriting of the whole General Motors project by metropolitan bankers, the terms of which were alleged to be a bond issue of $15,000,000, were all punctured almost as soon as they were floated.

As a matter of fact negotiations of the utmost importance to the company and the trade are pending at this time, but they have not been closed. The reports that will be published concerning the New York underwriting deal in particular has been thoroughly discredited.

At the offices of the company no official statement as to the status of affairs could be secured save that negotiations were under way looking to a solution of the financial problem involved.

Owing to the fact that the situation has numerous ramifications and is far from simple from any viewpoint, any forecast of the true result at this time would be impossible.

It is understood that the ultimate conclusion of the present negotiations contemplates entirely superseding anything in the way of tentative arrangements that may have been entered into. The situation could hardly be called *in statu quo*, because of the earnest efforts that are being made to accomplish something definite in the way of development.

Boston Auto Show Announced

BOSTON, Sept. 26—The Boston automobile show next March will not be a closed exhibition from which unlicensed cars will be excluded, as many people identified with motoring believed.

The show space will cover 105,000 square feet and the exhibition will open Saturday night, March 4, and continue through until March 11. The first floor will have the pleasure cars, the basement the commercial vehicles and the accessory men will be up in the balcony. The double-check system, in use at other shows, will be inaugurated here.

KisselKar 1911 Line Announced

MILWAUKEE, Sept. 26—The Kissel Motor Car Co., of Hartford, Wis., will build in the neighborhood of 1,500 cars for 1911, not including commercial or freight cars, the first models of which have just been issued. The 1911 KisselKar will be produced in five chassis types, as follows: 4-30, 4-50, 6-60, 6-70 and a 4-50 special, all being adaptable to various forms of bodies. The 1911 models contain few radical changes, but show a general refinement and the general lowering of the car.

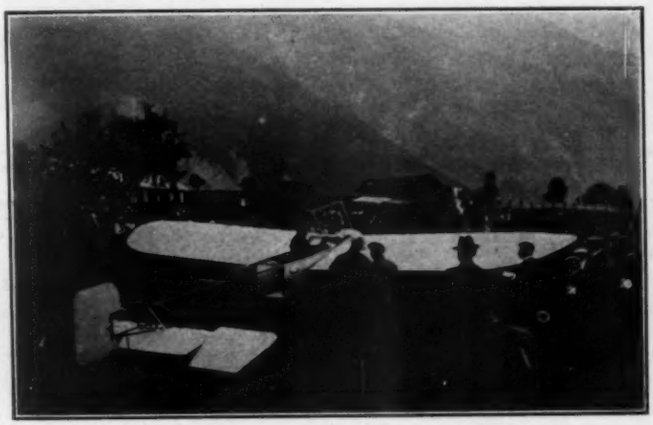
The principal change is in the frame, which will have a double drop on all models excepting the Western Special, a new model placed on the market for the first time. With 36-inch wheels and 4-inch tires provided on these models, an unusual clearance is given. The wheelbase of the car has been generally lengthened.

The system of braking is changed, the double internal brake giving way to one internal and one external excepting in the 4-30 chassis. Front axles will remain the same, excepting that spindles are changed, lowering the car one and one-half inches. The tie-rod will be on the rear and the steering arm above the axle. The clutch is improved by adding a little more face. Full universal is provided between clutch and transmission. In the motors the only change is that the oiling system is self-contained force-feed in the oil basin.

The radiator design is the same and is again distinguished by the white and blue enamel circular name-plate in the upper left-hand corner.

First Aeroplane Crosses Alps

BRIGUE, SWITZERLAND, Sept. 23—The illustrations as here afforded are of the first attempt made by Georges Chavez, taken during the flights he made just before he succeeded in crossing the Alps in his last flight, ending in the death of this daring aviator. He had made numerous efforts to accomplish this task, but on each occasion he found the pass hid away in a cloud bank and he was persuaded to turn back. At 1:40 p. m. on the day of his final attempt he found the conditions satisfactory; he started from the station at Brigue in the presence of numerous spectators. He negotiated the Simplon at a height of 450 feet, and had all but won the prize of $20,000 offered by the Italian society when he met his sad fate; a gust of wind took him unawares and his life was the forfeit. The accident took place at a point near Domodossola on the Italian side of the Alps.



Georges Chavez starts from Brigue, Switzerland

Chavez rising toward Simplon Pass at his first attempt

Chavez approaching Simplon Kulm on September 19

Doings in the East

IMPROVEMENTS AT THE MAXWELL PLANT—SYRACUSE RUN POSTPONED ON ACCOUNT OF WEATHER—POPE COMPANY'S FAVORABLE STATEMENT—FRANKLIN FORMS A SELLING ORGANIZATION

—The Abbott-Detroit will be handled for 1911 in Rhode Island by the Whittem Motor Vehicle Co., of 200 Meeting street, Providence.

—The Bison Motor Sales Co., of Main and Barker streets, Buffalo, N. Y., will handle the Abbott-Detroit for 1911 in addition to the K-R-I-T.

—The Howard Demountable Rim Co., formerly located at No. 1411 Race street, is now installed in new headquarters, 324 North Broad street, Philadelphia.

—The Danbury, Conn., Agricultural Society will give a fair commencing October 3 and continuing until Oct. 8. An automobile show and speed trials will be among the features of the fair.

—The Greenville Metal Products Company has increased its capital from $250,000 to $600,000, and will make big extensions to its plant at Greenville, Pa., where automobile parts are manufactured.

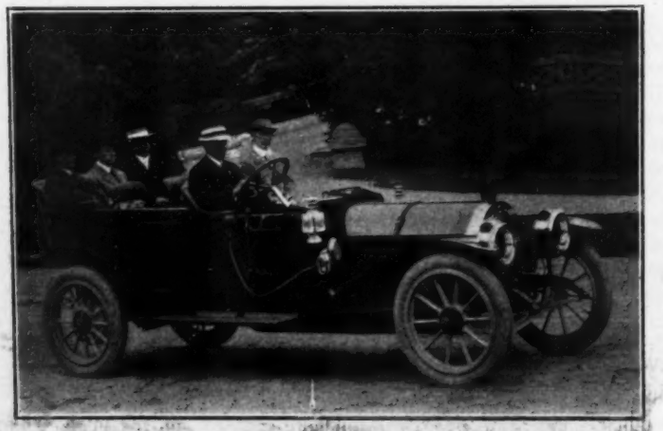
—Thos. J. Morthway, of 92 Exchange street, Ford agent at Rochester, N. Y., has taken on the Abbott-Detroit and is building an addition to his present garage and salesroom to accommodate the new line.

—The mammoth new garage of the Woods Electric Co. on Twenty-first street above Market, Philadelphia, is rapidly assuming definite proportions. It is expected to have the garage proper ready for business October 15.

—The T. C. Bradford Automobile Co., of Wilmington, Del., has taken the agency for the Hudson car for the peninsula, which comprises all of the State of Delaware, nine counties on the eastern shore of Maryland and two Virginia counties.

—Transformation of the Kingsland Point and Tarrytown plants of the Maxwell-Briscoe Motor Co. is being accomplished by the reclamation of about twenty acres of flooded lands between the plants. Several additional buildings will be erected on the sites thus made and the establishments will be practically connected.

—The New Jersey Automobile and Motor Club, leading the fight for remedial motor legislation in the State, intends next week to communicate with the office seekers of the State, asking their views on the motor situation. The big Newark club will then advise the 25,000 motorists of the State as to which candidates are aligned with them in their demands for more reasonable motor laws.

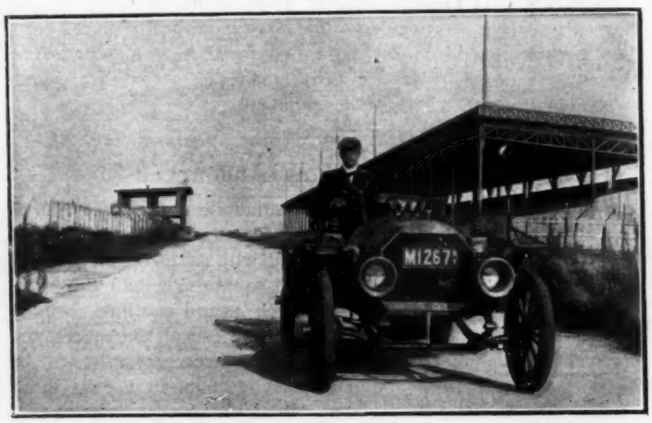


First 1911 six-cylinder Premier touring car—Designer George A. Weidely at the wheel, President Harold O. Smith beside him. In the tonneau are Treasurer Horace B. Hewitt, W. McK. White, advertising, and R. W. Macey, sales manager

—"What the Motorist Should Know," a handsomely made little booklet on proper lubrication, has been issued by the Vacuum Oil Company, of Rochester, N. Y. Aside from general information on the subject of motor lubrication, the book contains a list of 281 makes of automobiles with recommendations as to the variety of oil best fitted to each, in the opinion of the company.

—Of interest to the motoring public is the second annual statement of President Albert A. Pope of the Pope Manufacturing Co. to the stockholders for the fiscal year ending July 31, 1910. According to the president's report, the sales for the past year were $4,010,199.94, which represents an increase of $1,106,458.53 over the preceding year. The net earnings amount to $745,398.87.

—The Franklin Automobile Company, a selling organization dealing exclusively in Franklin automobiles, will hereafter be the distributor of all motor cars made by the H. H. Franklin Manufacturing Company. This company has branches in the following cities: New York, Boston, Chicago, San Francisco, St. Louis, Pittsburg, Buffalo, Baltimore, Cincinnati, Rochester, Cleveland, Albany and Syracuse.



Inspecting the Vanderbilt Cup Course in a Regal

—H. B. Larzelere, formerly sales manager of the Chadwick Engineering Works, has organized the Nance Motor Car Company in Philadelphia, which will build a popular-priced six-cylinder car. Mr. Larzelere will be president and general manager of the new concern and N. H. Adams head of the sales and advertising departments. The Nance company will shortly announce its full factory personnel and delivery dates of the new automobile.

—Negotiations have been completed by William P. Herbert, head of the General Motor Car Co., with the Rauch and Lang Carriage Co. of Cleveland, Ohio, for the agency in the Philadelphia territory of the latter's line of electric pleasure vehicles. The General Motor Car Co., which also represents the Lozier, likewise announces three additions to its selling organization—Keene Carruthers, of New York, A. Paul Oliver and Thomas J. Denney.

—The Syracuse *Herald* sociability run, scheduled for last week, had to be put over to Saturday on account of a severe rainstorm. There are over 100 entries for it. A picturesque trip is afforded through Camillus, Elbridge, Auburn, through the Owasco Lake Valley, Skaneateles Lake, Marcellus to Syracuse. The entire route is 74 miles. A secret time is set and the car coming nearest it is awarded a trophy cup, and there are also other prizes.

—Charles L. Stackpole has acquired control of the Yonkers Garage at Yonkers, N. Y.

—M. Zimbrich has purchased the salesroom and garage of the Geo. J. Arnold Co. at 103 Lexington avenue, corner E. Genesee street in Syracuse, N. Y., handling the Stoddard line.

—Walter R. Lee, secretary and general manager of the New York Automobile Trade Association, has been appointed assistant general manager of the Carhartt Automobile Sales Company of New York.

—The Pullman car is again represented in Boston, this time by the G. H. Proctor Supply Company.

—E. F. McDonald, Jr., has assumed the management of the Central Auto Sales Company, with offices in W. Genesee street, Syracuse.

—Albert M. Pearson, for a long time connected with the truck department of the Packard branch at Philadelphia, has resigned to accept a place with the Boston branch of the White Co. as manager of the commercial department.

The South and the Coast

AUTOMOBILE CLUB OF MARYLAND GROWING—ATLANTA'S NEW MAKERS SECURE TEMPORARY PLANT—PACIFIC HIGHWAY ASSOCIATION ORGANIZED

—Multonomah County, Ore., is expending $120,000 annually on roads in that county.

—The Moon car is being represented in Baltimore by Cooper & Upton, 2312 Madison avenue.

—Marcus Blanchard has taken the agency for the Everitt car for Santa Clara County, Cal., with an initial order of ten cars.

Overland 'bus by means of which Indianapolis kindergarteners are enabled to defy the weather

—A sales branch of the E-M-F Motor Car Company has been established in Wilmington, Del., with E. G. Brown as the manager.

—J. L. S. Snead, formerly of San Francisco, but now of Portland, has opened a branch distributing office for the K-R-I-T Motor Sales Co., at 276 Union avenue.

—E. B. Waterman, of Medford, Ore., has accepted the agency for the Speedwell car at that point. He is also vice-president of the Oregon State Automobile Association.

—A. M. Brown, of the Hiland Automobile Company, Pittsburg, Pa., which handles the Peerless line, has accepted the management of the H. O. Harrison, Los Angeles, business.

—Under the management of Azariel Smith and Chas. W. Cleveland, formerly of Toledo, O., the Hupp Motor Company has opened an agency in Portland, at Seventh and Couch streets.

—Residents along the Liberty Pike near Harrisonville, Baltimore county, celebrated the closing of the toll gate in that vicinity by burning a replica of the toll house and gate. The road is now a State highway.

—New agencies are constantly being established at Portland, Ore. The latest to enter the field is the Haynes Company, which has established an agency, and a large garage will be secured on "Gasoline Row" early next month.

—The Zell Motor Car Co., of Baltimore, will become the agents for the Hupmobile October 1 for the State of Maryland and the city of Washington. The Zell Co. also handles the Chalmers-Detroit, Peerless and Hudson.

—The Automobile Club of Maryland has ushered in the Fall by admitting 22 new members. These include many of the most prominent business and professional men of the city and one lady, the latter being Mrs. L. Marshall.

—F. E. Cohen & Brother, Portland, Ore., besides handling the Maxwell during the next season, will be agents for the Columbia car and the Sampson trucks. The Columbia car has not been represented in Portland heretofore.

—The McCarty Automobile Company, of Spokane, has been incorporated, capital, $25,000, with L. D. McCarty president and general manager. A temporary office will be opened in the Eagle block. It will handle the Rambler.

—The Ajax Auto Traction Company, of Kenton, Wash., has commenced the erection of its plant, which will be 80 x 200 feet in size. It will engage in the manufacture of gas engines for autos, auto trucks, marine and stationary engines.

—The Primo Motor Company, Atlanta's new automobile maker, has secured a temporary plant. It is located in Atlanta, on the Georgia Railroad, and contains 15,000 square feet of floor space. Machinery will soon be installed in this building.

—Edward B. Zane, who has been Spokane, Wash., manager for Nute & Keena, handlers of the Packard, has bought the Eastern Washington territorial rights, and has put in orders for a number of 1911 Packard cars. He will continue as heretofore at 1012 First avenue.

—The Pacific Highway Association of North America was organized September 19th at a meeting in Seattle at the Arctic Club, following a banquet given by the Automobile Club of Seattle to visiting autoists from all the important cities of the Pacific Coast. This is the outgrowth of the Western Automobile Association. The new association will have as its principal object the promotion of the construction of an international highway along the Pacific Coast from Canada to Mexico.

Great Western 1911 semi-torpedo—General Manager E. MacK Morris at the wheel, President Milton Kraus beside him. In the tonneau are Secretary R. H. Bouslog, Vice-President A. L. Bodurtha and Superintendent Paul Creighton

Middle West News

BRODESSER TRUCK COMPANY MOVES FROM MILWAUKEE TO JUNEAU—GARFORD AND KISSEL COMPANIES LICENSED UNDER SELDEN PATENT—MANY AGENCIES AND BRANCH HOUSES ESTABLISHED

—The agency for the Cole "30" has been secured in St. Louis by A. A. Franklin & Company.

—E. L. Dundon has been appointed St. Louis agent for the Jenkins emergency automobile wheel.

—Jose M. Sojo, of San Juan, Porto Rico, has signed up with the Abbott Motor Co. for the agency of the Abbott-Detroit car.

—The Schreiber Motor Car Company of Milwaukee, Wis., has taken the agency for the Hudson car in addition to the Locomobile and Haynes.

—The Steely Auto Engine Company, with a capital stock of $150,000, has just been incorporated to make automobiles and light delivery wagons at Detroit.

—A. F. Eckstein, of Milwaukee, Wis., has become general manager of the Highland Garage Company, Twenty-seventh street, near Highland boulevard.

—J. V. Black, recently of Detroit, is to take charge of the Goodrich business in Cincinnati. He will be located in the Goodrich Tire Company's new building on Race street.

—Announcement is made that The Garford Co., of Elyria, O., and The Kissel Motor Car Co., of Hartford, Wis., have just been granted licenses under the Selden Patent No. 549,160.

—The Ritter Automobile Company has been incorporated at Madison, Wis. The capital stock is $25,000. Henry R. Ritter, J. C. Harper and Homer E. Webster are the incorporators.

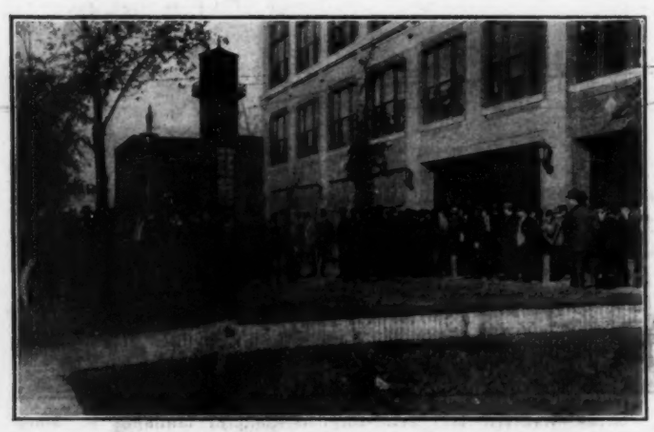
—J. H. Diehl, for many years a Cleveland business man, will have charge of the factory branch which will be established in Cleveland by the Louis J. Bergdoll Motor Co. of Philadelphia.

—H. B. Waltz, who has been identified with the selling end of Cleveland automobile agencies for some time, has joined the sales force of the Sterling Motor Sales Co. and will sell the Cutting car.

—The Gilchrist Motor Sales Company, with headquarters at the Empire Garage on Seventh street, Cincinnati, is now handling the "Matheson Six," formerly represented by the J. S. Stevens Auto Company.

—Charles M. Culp, of South Bend, has been granted a patent on an emergency tire which may be attached to an automobile wheel. The tire is made up of six parts, which may be stored under the seat of the machine.

—At the adjourned annual meeting of the Atlas Drop Forge Company, at Lansing, Mich., the board of directors was re-elected. The board elected the following officers: President, R. E. Olds; vice-president, R. H. Scott; secretary-treasurer, S. H. Carpenter.



Men at Packard factory waiting for time office to open in order to obtain positions in answer to "Help Wanted" ads

—McAlister Brothers Motor Car Company, which handles the "Cadillac" car in Pittsburg, has just moved into its big new building at Baum and Beatty streets, East End, one of the most complete automobile plants in the country.

—M. K. Enders, of New York, who has been connected with the Ford Motor Company for five years as traveling representative of the New York branch, has taken charge as manager of the Ford Motor Company's branch in Cincinnati.

—G. H. Wallis, of Corliss, Wis., has been appointed chief engineer of the Kelly-Racine Rubber Co., which is now erecting a $500,000 plant at Racine, Wis. Mr. Wallis has been erecting engineer for the Corliss Engine Co., at Corliss, near Racine.

—The Mitchell-Lewis Company, of Racine, Wis., has placed with the Laporte Carriage Company, of Laporte, an order for 1,000 five-passenger automobile bodies. The order is the largest the Laporte concern has ever received and amounts to $140,000.

—Walter Egerton, who has been connected with the Barclay Auto Company, of Minneapolis, in the capacity of salesman, for several seasons, resigned his position last week to go with the Winton Motor Carriage Company's Minneapolis branch.

—At the annual meeting of the Longdin & Bruegger Co., of Fond du Lac., Wis., manufacturers of tops, canopies, dashes, etc., it was decided to enlarge the present plant by the construction of a three-story addition, 30 by 40 feet, and remodel the old works.

—A. H. Wyatt and W. H. Kitto, of Cleveland, will build an auto truck plant at Lisbon, Ohio. A fund of $25,000 is being raised by the people of the city for the purpose of buying stock in the new concern. Present plans contemplate placing the plant in operation this fall.

—The Regal Motor Car Company of Detroit has established its own factory branch in Minneapolis for the distribution of this make of vehicle throughout the Northwest. Headquarters have been established at 418 to 420 Third avenue South. The firm name will be the Minneapolis Regal Auto Company, and J. P. McGuire will be in charge.

—The Brodesser Motor Truck Company of Milwaukee, Wis., has completed the formality of changing its place of business to Juneau, Wis., by filing amendments to its articles of incorporation to this effect. Work on the new plant at Juneau is being rushed and it is possible that occupancy will be given on December 1 instead of January 1.

—The Abbott Motor Co., of Detroit, will be represented at the Vehicle and Implement Show in the Coliseum Building at Chicago the week of October 10 to 15 by three cars, a roadster with fore doors, a fore-door touring car and the regular touring car and stripped chassis. The exhibit will be in charge of Sales Manager V. K. McBride and a corps of experienced demonstrators.

—The Chase Motor Car Company, of New Bremen, O., has been incorporated with an authorized capital stock of $50,000. There are thirty-five stockholders in the company. The plant of the Grothaus Laufersieck Company has been secured, and motor trucks of the commercial variety will be manufactured. The incorporators are J. H. and Edmund Grothaus, J. F. Laufersieck, Otto J. Doesel and Louis Huenke.

—The Rockhoff Foundry Company, of Fostoria, Ohio, has commenced work on a new factory building, 40 x 100 feet, at Mishawaka, Ind. The concern is an extensive manufacturer of crankcases for marine and auto engines. The company makes a specialty of heavy aluminum castings and at present has large contracts with the Apperson and other automobile concerns for thousands of crankcases for immediate delivery.

Packard Taking On, Not Laying Off Men

Contrary to the rumor which has had widespread circulation, the Packard Motor Car Company denies that it has laid off several thousand men at its Detroit plant. In proof of its assertions the company, through General Manager Alvan McCauley, has given out a statement that the company is taking on men at the rate of about 100 a day as its new buildings are finished or new machinery is installed.

In this statement it is asserted that the force of over 5,000 men is being constantly added to and that 500 more men will be put to work within a week.

The following advertisement was inserted recently in the Detroit newspapers:

"WANTED—Automobile workers in all departments—machine operators of all kinds, assemblers, body makers, painters and finishers.

"Packard Motor Car Company."

The Packard Company shows in the accompanying illustration how it was answered.

On page 444 of our issue of September 15th we stated that the equipment of the Stoddard-Dayton stock cars includes a storage battery, which is not the case. The ignition system installed on this make of car comprises a Bosch high-tension magneto and a set of dry cells, constituting two independent means for igniting the charge.

Goodrich Succeeds with Campaign of Education

Some time last April the B. F. Goodrich Company, maker of the well-known Goodrich tire with a large establishment at Akron, Ohio, decided to conduct an educational campaign with a view to acquainting automobilists with the tire situation as it is hoping, perchance, to make a long stride in the direction of the more or less complete elimination of the many foolish ideas that pass current among automobilists in relation to tires. A series of moving pictures were brought together, they representing every phase in the manufacture of tires as the work is done by the Goodrich concern, beginning with the tapping of the trees in South America to obtain the supply of latex passing along and into the plant where the various steps in the process are clearly depicted, and the final product is shown in service. An engaging lecturer conducted this campaign and the motion pictures were shown in Ohio, Pennsylvania, New York, New Jersey, West Virginia, Maryland, Connecticut and Maine, but it is understood that the campaign will continue until the entire country is covered. The entertainment is heralded under the caption "Tree to Tire," and the illustration here presented represents a body of 2,500 persons who were in attendance at the Light Guard Armory in Detroit, and it is a noteworthy fact that upward of 2,000 persons were turned away. One of the surprises of this campaign is represented in the interest that women folks are taking; probably 20 per cent. of the attendance is made up by ladies. The company finds ample evidence of the fact that education has real merit.

BIG CROWD IN LIGHT GUARD ARMORY, DETROIT, LISTENING TO GOODRICH TIRE LECTURE "TREE TO TIRE"

Continental Motors

A MOTOR OF COMPACT AND CLEAN DESIGN SUITABLE FOR AUTOMOBILE WORK; PARTICULAR ATTENTION HAS BEEN PAID TO LUBRICATION, COOLING AND ACCESSIBILITY

THE first thing that strikes one in looking at the Continental motor is the absence of unnecessary parts and the compactness and cleanliness of the design. One great object that seems to have been achieved is the accessibility of all parts that require dismantling from time to time for the purpose of adjustment or cleaning.

The motor here shown is the new Model "T," having a bore of 5 inches and a stroke of 5 3-4 inches; it is of the four-cycle type with the cylinders cast in pairs, and the inlet and exhaust valves placed on opposite sides. This style of construction adds to the cost of manufacture and slightly to the weight, but obviates certain difficulties sometimes encountered with piping and get-at-ability in other systems.

The timing gears are all placed in a clean housing in front, with a plate that is easily detached. The suspension lugs are of ample proportions and are so made that the alignment can be easily made by the aid of packing pieces under the extensions that rest on the frame. These can clearly be seen in Fig. 1. The same gearing is utilized to drive the pump and the magneto, a Bosch high tension, which can easily be dismantled by unscrewing the holding-down bolts under the base plate. The pump is fitted with two stuffiing boxes on either side of the main body. Behind the magneto is situated the main oil filler of ample dimensions, with a cap that serves the combined purpose of cap and vent plug. The exhaust manifold is particularly clean and it will be noticed that there are four outlet ports giving a quicker passage for the exhaust gases besides reducing the heat over the valve heads.

The water connections are made at the lowest point of the circulation, and the easy bends are conducive to an even flow for the water.

At the rear end of the lower half of the base chamber there is a large plug to empty the oil, and as the incline of the casting is toward the rear, all the oil can be emptied with the one plug.

The amount of oil in th base, which when full holds four gallons, is registered by a neat device which is located between the cylinders and can easily be seen. Besides the splash system of lubrication there is attached to this motor a new patent force-feed oil pump, shown in Fig. 2, being under positive pressure. One stream of oil is fed in over the gears, another to Nos. 1 and 2 connecting oil bushings and a third to connecting-rod bushings Nos. 3 and 4. All oil before going into the pump must pass through a thorough cleansing process which prevents all impurities from reaching the bearings.

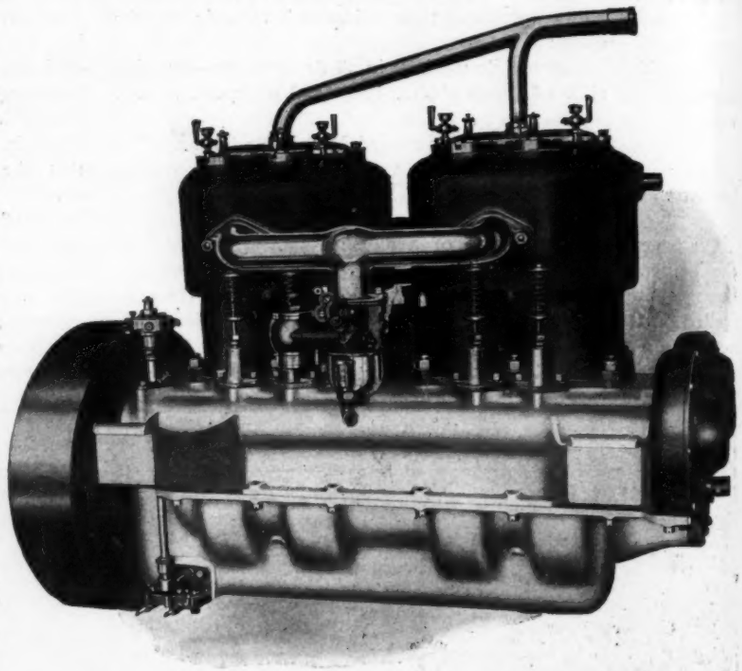


Fig. 2—Inlet side of engine, showing carbureter and oil pump

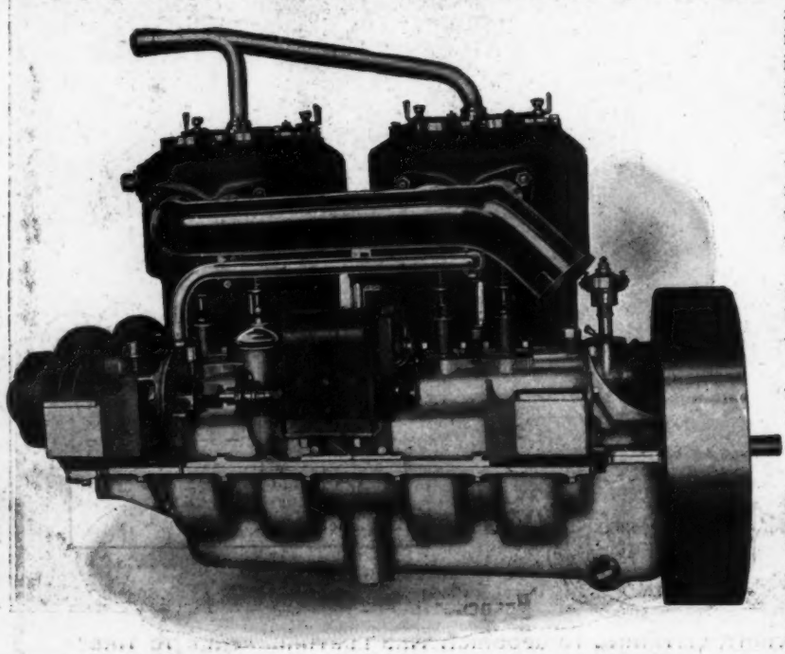


Fig. 1—Exhaust side of motor, showing pump, magneto and exhaust manifold

The crankshaft and camshaft bearings, which are very liberal, are of white bronze. The connecting-rod and main bearings are provided with liners 0.002 thick, so that the slightest wear can be easily taken up.

The balancing of the motor has been a matter of special study, the flywheel and crankshaft being balanced separately and all reciprocating parts are weighed into less than one-half ounce.

The inlet side of the engine, Fig. 2, clearly shows the absence of complication, the only parts being the Schebler carbureter and the distributor for the coil and battery ignition.

All the valve lifters are fitted with adjustable feet so that all wear can readily be taken up. Pet-cocks are fitted, and on the front cylinder provision is made for fitting a fan bracket.

The engine is manufactured by the Continental Motor Manufacturing Company, Muskegon, Mich., which makes a specialty of the construction of all kinds of motors for marine and automobile purposes.